WORK PATTERN DIFFERENCES BETWEEN MALE AND FEMALE ORTHODONTISTS IN CANADA

By

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ABSTRACT

Objective: To examine sex-specific differences in the demographics and work patterns of Canadian orthodontists.

Methods: Questionnaires were mailed/E-mailed to a random sample of 384 orthodontists (189 male, 95 female). Questions regarding work patterns and personal demographics were created and sex-specific comparisons were conducted.

Results: The response rate was 53.9%. The demographics and work patterns for male and female orthodontists were similar for most variables. Females were found to be younger; anticipating earlier retirement; and more likely to take a leave of absence. When analyzing the effects of the sex, age, and number of children, age significant affected the number of hours worked per week and number of phase II starts per year. Having children did not significantly affect any variables analyzed.

Conclusions: As female orthodontists were not found to practice substantially different from males, it is not possible to speculate that the increasing number of women specializing in orthodontics would provoke change in the profession.

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CHAPTER 1: INTRODUCTION/ LITERATURE REVIEW

INTRODUCTION

The number of women entering and working in formerly male-dominated health professions has increased significantly in recent decades. Data from the 2011 Canadian census indicate that women constitute 61% of pharmacists, 40% of all medical doctors, and 35% of dentists[1]. These numbers have increased from the 2006 Canadian census where women constituted: 59% of pharmacists; 36% of all medical doctors; and 31% of dentists[2]. These numbers are expected to continue to increase in the future, as nearly half of the graduating students in each of these professional schools are female[3-5]. As the number of women pursuing professional careers increases, the number of women specializing within their profession is expected to increase as well, a trend that has been observed in the dental specialty of orthodontics.

In the initial Journal of Clinical Orthodontics American Practice Study, completed in 1981, female orthodontists comprised 0.6% of the respondents[6], while female orthodontists comprised 12-14% of the respondents in the repeated practice studies from 2005-2011[7-10]. The number of women specializing in orthodontics is expected to continue to increase, as indicated in the 1999 annual survey conducted by the American Dental Association Survey Center[11]: 33.9% of orthodontic residents in the United States were female. In the repeated study in 2010, the proportion of female residents

increased to 38.9%[12]. Similar trends are observed in Canada. In 2006, 36.2% of orthodontic residents were female[13]; in 2012/13 women comprised 47.1% of the orthodontic residents in Canadian programs (as determined by personal communication with 2012/2013 residents in all academic programs). As the number of women working in the orthodontic workforce continues to increase it is important to determine the potential implications this may have for the profession as a whole.

The following literature review provides a summary of work pattern differences between male and female orthodontists. The first section presents information on the process of feminization, while the second section reviews the available literature comparing work pattern differences between male and female dentists and dental specialists, including orthodontists (See Appendices A-E for systematic search strategy, article selection process and summary of selected article results). As the increased proportion of women specializing in orthodontics is relatively recent, the amount of published literature on female orthodontists is somewhat scarce. Consequently, available information on work pattern differences between male and female dental specialists and general dentists is reviewed as a comparative guideline.

1) THE PROCESS OF FEMINIZATION

Feminization has been defined in the sociological literature as the movement of women into occupations in which they were previously underrepresented[14]. Furthermore, feminization has been defined as not only the increase of women within an occupation,

but a structural shift within the profession, to the point where it becomes known as "women's work"[15]. In the later context, the process of feminization of a profession has the potential to change the very nature of the profession involved. This concept has brought much attention and speculation concerning the driving force of feminization and the potential implications that this movement may have on professions undergoing feminization[16-20].

i) THE QUEUING THEORY

One of the most prominent frameworks that attempts to explain the driving force of feminization of occupations is the 'queuing theory'[20]. According to this theory, the composition of occupations is based on a dual queuing process, where employers develop labor queues and rank employees based on desired characteristics, and personal bias, and employees create job queues where jobs are rated in terms of attractiveness. Job positions are filled based on employers selecting employees as high up the labor queue as possible, and employees choosing the best positions available to them. Historically, men have preferred professional occupations and have rated them as most attractive employment opportunities for autonomy, financial rewards, respect and prestige. As well, men have traditionally been at the top of the labor queue for professional employment and educational admissions. As a result, many professional occupations have been male-dominated since their inception. However, any disruption or alteration to either the job or labor queue can result in a change in the composition and ranking of either queuing process.

ii) THE PREFERENCE THEORY

The effect of feminization on the profession of orthodontics will be analyzed using Catherine Hakim's "Preference Theory"[21]. The "Preference Theory" is based on the premise that women, although united by sex, are heterogeneous in nature. The "Preference Theory" takes into account that women's behaviors are influenced by different personal preferences and that lifestyle choices of individuals in modern societies are influenced by their attitudes, preferences and values. Using this theory, three distinct groups of women can be defined using the relative importance of family and employment and how these values influence women's career decisions and goals.

(1) *Home-Centered:* Approximately 20% of women fall into this category. For these women, children and family life are the main priorities throughout life; these women prefer not to work outside of the home. They dedicate their time and energy to their home and family.

(2) *Adaptive:* Approximately 60% of women fall into this category. This group of women is the most diverse, as it includes women who have unplanned careers and women who want to combine work and family responsibilities. According to Hakim, these women are classified as wanting to work but not completely committed to their work career.

(3) *Work-Centered*: Approximately 20% of women fall into this category. The majority of women in this category are childless, by choice. Their main priority in life is employment, and they are fully committed to their work and associated responsibilities.

The “Preference Theory” can also be applied to men, however the proportions of men who fall into each of the three categories differs, approximately 10% of men are considered “*family-centered*”, 30% “*adaptive*”, and 60% “*work-centered*”.

When applying the “Preference Theory” to the specialty of orthodontics certain considerations can be made. The category of “*home*-centered” individuals does not apply to orthodontists. Individuals who fall into this category will not pursue a career in orthodontics, as it requires a significant number of years of education and a substantial financial commitment to obtain the qualifications required for the specialty. Therefore, as these individuals are home and family centered, they would not endure this timely and costly education. As a result, it can be assumed that individuals who enter the specialty of orthodontics are either “*adaptive*” or “*work-centered*”.

One of the advantages of the specialty of orthodontics is the option to choose desired working conditions. As an orthodontist it is possible to choose to independently own and operate a practice, work as a partner, an associate, an educator or any combination of these options. Furthermore, orthodontists can choose the geographic location of their practice, number of hours worked per week, number of patients seen per day, number of days worked per week, and the amount of vacation taken each year. Due to the amount of flexibility orthodontists have in their practice design and setup, there exists the potential for many variations in work patterns among orthodontists. When

considering the amount of flexibility in orthodontist practice and work patterns it can be assumed that "*work-centered*" individuals would have similar practice and work patterns, while the most variation would exist between "*adaptive*" individuals. Consequently, when looking at the proportions of males and females who fall into the "*adaptive*" category, proportionally more women are considered "*adaptive*". As a result, when strictly applying the "Preference Theory" it would be expected that the most variation in orthodontic practice and work patterns would exist among women, which could be significantly different from the majority of male orthodontists. However, it must be considered that when choosing to specialize in orthodontics, many individuals are drawn to this specialty based on the premise of work flexibility and freedom, this allows for an "*adaptive*" and balanced lifestyle between work and family. Therefore the proportion of "*adaptive*" individuals who specialize in orthodontics may be considerably similar between the sexes. This likely applies to orthodontics, but it is not implied that it will be the case for other dental specialties.

iii) ADDITIONAL TRENDS

While there is support of the 'queuing theory' on the feminization of health care professions, other factors have been found to be associated with the influx of women into previously male-dominated professions. Some trends that have been observed to influence the feminization of professions include: a) occupational and economical changes altering job attractiveness to future candidates[20,22]; b) a reduction in occupational entrance barriers through the development of antidiscrimination laws

altering the pool of qualified candidates[23]; and c) anticipated labor market shortages or altered rate of market growth[24]. In these situations there is either a reduction in the number of men available to fulfill the employment demands, or an increased quality of available female candidates, which results in an increased influx of females into previously male-dominated positions.

iv) IMMIGRATION

Additionally, it has been suggested that occupational feminization is a consequence of immigration[17]. Although often overlooked, many women entering the dental and medical professions in the United States and Canada are often foreign born and trained. In the 1960's the majority of female dentists in Canada and the United States were foreign-born[25]. By 2001 greater than 33% of female dentists in Ontario were foreign-trained, as compared to 15% of men[16]. Immigration may be somehow shaping the feminization of some professions, such as dentistry.

In professional occupations such as dentistry and orthodontics, there is no evidence to support the argument that feminization of the profession is associated with a professional status decline, because health professions are amongst the most attractive, secure, and well-paying professions in the labor market[17, 26]. Policy-setting bodies that control the entrance of applicants into the educational system regulate these professions. In times of anticipated labor shortages these gatekeepers have allowed admission of formerly excluded groups, such as women, into the profession[20]. Furthermore, professional occupations have become increasingly feminized since the

implementation of antidiscrimination rights, in conjunction with feminist activists lobbying for increased female entrance into educational programs. In recent decades, these changes, in combination with educators' indifference to gender of candidates, have created a more balanced queue of qualified applicants and trained professionals. As the proportion of women working in previously male-dominated professions has increased, speculations have been made on the potential impact this may have on the profession as a whole.

2) WORK PATTERN DIFFERENCES BETWEEN MALE AND FEMALE DENTISTS AND DENTAL SPECIALISTS

Men and women receive the same educational training within their dental and dental specialty programs; they undergo years of rigorous training and education regardless of gender. However, historically, men and women have assumed different roles and responsibilities with respect to work and raising a family. Traditionally, it was assumed that men worked full-time and provide for the family, while women maintained the domestic responsibilities of housework and child rearing. These traditional gender roles have created a segregation and possible stigma between men and women, especially in the workforce. As women in today's society are entering the workforce and increasing in numbers in formerly male-dominated professions, it is often assumed that women and men will practice their professions differently. Women have been criticized for being less committed to work than men[27], more likely to work less hours than their male counterparts[28], and if given financial security will choose motherhood over work[29].

As the proportion of women entering the dental profession has increased, there have been numerous published commentaries, studies, and surveys analyzing the impact of women on the profession of dentistry and its specialties. This section will review relevant studies that have analyzed the practice and work pattern differences between male and female general dentists and specialists from 9 perspectives: i) age, ii) martial status, iii) children, iv) practice ownership, v) number and location of offices; vi) hours worked, vii) patient flow, viii) vacation and career breaks, and ix) retirement.

i) AGE

When analyzing age differences between male and female dentists and dental specialists, the results are fairly consistent. Although evidence can be found to support the notion that there is no significant difference in age between the sexes for general dentists in the US[30] and pediatric dentists in Israel[31], the majority of the available literature suggests that a difference in age and work experience exists between the sexes. It is evident that women in dentistry and its associated specialties are younger than their male colleagues[7-10, 32-50]; this difference in age typically translates to a similar difference in work experience. Although the effect of age on work patterns is not commonly assessed, it was analyzed for orthodontists in the US; the findings indicated that although a significant difference in age existed between the sexes, age did not affect the number of days worked per week or number of patients seen per workday for either sex[49]. However, age has been found to have an impact on the work patterns of

male general dentists in the US; after the age of 55, the number of hours worked per week has been found to decrease more for male than female dentists[51].

ii) MARITAL STATUS

The available literature that analyzes the marital status of dentists and dental specialists unanimously indicates that male dentists and specialists are more likely than their female colleagues to be married[32, 36,42, 49, 52, 53]. Limited evidence also exists to suggest that female dental specialists in the US are more likely to have a spouse that is employed full time than their male colleagues[44,49].

iii) CHILDREN AND THE EFFECTS OF CHILDREN ON WORK PATTERNS

From the available literature, evidence exists to indicate that male dentists are more likely than their female colleagues to have young children[32]. Additionally, it has been found that in the US, female oral surgeons and orthodontists have fewer children than men[42,49].

When the effects of children on various practice related variables for men and women have been analyzed, the results have been relatively consistent. When work patterns of dentists in the US were assessed between the years of 1979-1999 it was found that having young children affected women more than men, as having young children reduced the total number of hours worked per week for women, while this pattern was not found for men[51]. A study conducted in the UK found that having children had no

significant effect on number of weeks worked per year for either male or female general dentists[33-35]. However, the same reports found that having children affects the number of hours worked per week; women with children were found to work the fewest hours per week, while men with children worked the most. Similar results were found in studies analyzing general dentists practice patterns in the UK[52] , and South Africa[53], with results indicating that women with young children work less than childless women and all men.

Children have been found to affect the work patterns of dental specialists as well. In a study that examined practice pattern differences between male and female oral surgeons in the US, it was found that female oral surgeons with children worked fewer hours per week than childless women, while the reverse trend was observed in male oral surgeons[42]. A two-part study analyzing practice patterns of orthodontists in the UK found similar results: for each additional child an orthodontist had, men worked 0.3 more clinical sessions per week; women were found to work 0.6 less sessions per week (one session equals 3.5 hours)[47, 48]. Similar results have been found for orthodontists in the US: women with children were found to work less than childless women and all men; and men with 3 or more children were found to start more new cases per year and see more patients per workday than men with fewer or no children and all women[49]. Additionally, this study found a positive correlation between the number of children and the total number of weeks of leave of absence over a career for orthodontists in the U.S.

iv) PRACTICE OWNERSHIP

The literature suggests that the most common practice arrangement for both male and female general dentists is in private practice. However, female dentists are less likely than male dentists to be practice owners [30, 33-41, 50,67]. Female dentists are more likely than males to work as employees[30], associates[33-36], in Government[41], or University Faculty positions[53, 67]. This was found to be true for pediatric dentists and orthodontists as well. Both men and women have been found to predominately work as solo practitioners. However, females are more likely to work in non-ownership positions than their male colleagues[44, 49].

v) NUMBER AND LOCATION OF OFFICES

In today's society it is common for dentists and specialists to work in more than one office. No evidence has been found to indicate significant differences between men and women in the number of offices worked in for general practices. Among dental specialists, men are more likely to work in a greater number of offices than women. In Israel, male pediatric dentists are more likely to work in more than one office more commonly than women[31]. Similarly, in the US, male orthodontists have been found to work in a greater number of offices than their female colleagues. In a survey conducted in 2004, men were found to work in an average of 2.4 offices, while women worked in an average of 1.7 offices[49]. Additionally, in a biannual practice study in 2005, it was found that male orthodontists worked in significantly more satellite clinics than women; however, this difference decreased to non-significant levels in subsequent surveys[7-10].

When analyzing the size of community in which the dentist or dental specialist practices, the results are unanimous; the most common location for both men and women to practice is in metropolitan areas. However, studies suggest that male dentists and specialists have an increased rate of living in smaller communities than their female colleagues[41, 44, 51, 53].

vi) HOURS WORKED

It is often speculated that women will dedicate fewer hours to work than their male colleagues, as they often have increased responsibilities associated with raising and tending to their families. The results of analyses of hours worked between male and female dentists and specialists are not consistent throughout time or location. In the US, it was found that when the age and number of children of a general dentist was statistically controlled, for the time period of 1986-1999, women worked 5 fewer hours per week than their male colleagues. However, in subsequent years the difference was reduced to non-significant values[51]. Furthermore, in a survey completed analyzing practice patterns of general dentists in the US in 1985, no significant differences were found to exist for number of hours per week in direct patient care between the sexes. In the UK, studies have demonstrated that female general dentists work an average of 8 fewer hours per week[33-35] and are more likely to choose to work part-time[52] than their male colleagues. Similarly, in New Zealand, female dentists have been found to work 7 fewer hours per week than men[36]; and in Australia, results of a longitudinal study

repeated every 5-years, from 1983-2009, demonstrate consistently that female dentists are more likely to work part-time than male dentists, with men working significantly more hours per year than their female colleagues37-40, 50.

Differences exist in the number of hours worked between the sexes for dental specialists as well. In the US, although it has been found that male oral surgeons are significantly more likely to work full-time than female oral surgeons (15.1% and 32.5% respectively). Overall, male and female surgeons have been found to work a similar number of hours per week[42]. A study conducted in Israel examining practice characteristics of pediatric dentists found no significant differences between the sexes for the number of hours worked per week[31]. While in Puerto Rico, it was found that female pediatric dentists work 6 more hours per week than their male colleagues[43]. Contradictory findings have been made for pediatric dentists in the UK, where if was found that men worked full-time (greater than 8 half-day sessions per week) significantly more than women[45]. The limited evidence analyzing hours worked for orthodontists indicates that, on average, men work more than women[46, 47, 49]. Female orthodontists in the US have been found to worked significantly fewer days than their male colleagues of similar ages, with differences ranging from 0.37-0.75 days per week[49]. Similarly, in the UK, it has been found that male orthodontists work slightly more sessions per week (one session equals 3.5 hours) than their female colleagues[46, 47].

vii) PATIENT FLOW

Patient flow for dentists and dental specialists is often assessed using patients seen per day, per week or per year. The available evidence suggests that female dentists see fewer patients than their male colleagues. In the US, female dentists have been found to see 16.3% fewer patients per day[54]. Other comparisons between male and female dentists in the U.S. are limited; however, a study from 1988 found that female dentists in the U.S. scheduled fewer patient appointments per day than their male colleagues[30]. Similar findings have been made internationally. In Australia, it was found that male dentists had more patient visits per hour and patient visits per year than females[37-40, 50].

The literature suggests similar differences between the sexes for dental specialists. In the US, male oral surgeons have been found to see 12 more patients per week than their female colleagues[42], while male orthodontists have been found to see an average of 10 additional patients per workday than women of similar age[49]. Additionally, in the UK, male orthodontists have been found to start approximately 35 additional cases per year than female orthodontists[46].

viii) VACATION AND CAREER BREAKS

When assessing differences between the sexes for vacation taken per year and leaves of absences throughout a career, there are significant differences between the sexes. Female general dentists in the US have been found to work fewer weeks per year than men, with 16% of women and only 6% of men taking at least 7 weeks of vacation per year[30]. Similar findings have been made in Australia[41] where female general dentists

have been found to work 3 fewer weeks per year than their male colleagues. While in the UK, it was found that female dentists work an average of one fewer week per year and take an average of 5 additional months of leave, over their career, than their male colleagues[33-35]. Female general dentists in New Zealand have also been found to take more career breaks than men[36].

Similar findings have been made for dental specialists. In the UK, it has been found that female pediatric dentists[45] and orthodontists[47] take more career breaks than men, most often associated with maternity leave. For orthodontists in the US, it was found that there is no significant difference between the sexes for the number of weeks worked per year, however, over a career, women took significantly more leaves of absences than men[49]. For both general dentists and dental specialists, women have been found to most often take leave of absences for maternity and child rearing, while men most likely to take leaves for personal illness[47,33-35,36,45, 49].

ix) RETIREMENT

When the planned retirement ages of general dentists and dental specialists were assessed, significant differences have been found to exist between the sexes. In New Zealand, female general dentists were found to plan on retiring earlier in their careers than males[36]. Similar results have been found for pediatric dentists in Puerto Rico, where it was found that men planned on staying in clinical practice for an average of 5 years longer than women[43]. When retirement plans were assessed for orthodontists in

the UK in 2004, it was found that more men were planning retirement within the next 15 years than women[46], however when a similar analysis was completed in 2006, there were no significant differences between the sexes[47, 48].

SUMMARY

The above review highlights the results of relevant studies examining the practice patterns of male and female dentists and dental specialists. These studies have identified notable sex-based differences in practice and work patterns that are evident globally, throughout time.

Although statistically significant differences in work patterns have been found to exist between male and female dentists and specialists, the extent of the differences has been found to vary with respect to year of study completion, location of study and population of dentists and specialists analyzed. Furthermore, the clinical significance of these differences has not been determined. The long-term effects, consistency and clinical implications of these demographic and work pattern differences have not been assessed over time. In order to determine the true impact of the increasing proportion of women on the dental profession comparison and follow up studies are indicated.

CHAPTER 2: RESEARCH OBJECTIVES

INTRODUCTION

In the United States, the number of female dentists increased from less than 2% in the 1970's[55] to an estimated 22% in 2009[56]; the number of female orthodontic specialists has increased from less than 1% in the 1960's[6] to an estimated 13% in 2011[9, 10]. As the proportion of women specializing in orthodontics has increased, speculations have been made concerning the potential effect this may have on the profession[47, 48, 57].

Men and women receive the same training within their orthodontic programs. However, they have historically assumed different roles and responsibilities with respect to work and raising a family. Therefore, there is speculation that women will practice their professions with a different approach compared to men.

SIGNIFICANCE TO ORTHODONTICS:

The number of women specializing in orthodontics has increased significantly in recent decades and is projected to continue to increase[57]. As it has been speculated that women and men often practice the same profession differently, it is crucial to understand the current demographics and work patterns of Canadian orthodontists, to allow sex-specific comparisons. If sex-specific differences exist, then the increasing proportion of female orthodontists has the potential to alter the "effective supply" of orthodontists in Canada, as the "effective supply" is influenced by hours worked, productivity and other personal factors[51]. To date, no study has been completed to

compare orthodontic work pattern differences between the sexes in Canada. This information is especially valuable to the Canadian orthodontic community, and will give our professional regulating bodies the information needed to make valuable predictions about the impact that the proportional sex shift could potentially have on the orthodontic workforce supply in Canada.

SPECIFIC GOALS OF STUDY:

The purpose of this study was to assess the current work patterns of male and female Canadian orthodontists, to determine if any sex-specific differences exist. This study examined the current personal and practice demographics, family structure, work patterns and practice characteristics of Canadian orthodontists. Sex-specific comparisons were conducted to identify factors that influence practice and work pattern characteristics, in an effort to speculate if the feminization of orthodontics within Canada will affect the future delivery of orthodontic care.

RESEARCH QUESTIONS

(1) What are the current practice characteristics of orthodontists practicing within Canada? (i.e. personal and practice demographics, practice activity, productivity, and current working arrangements)

(2) What are the practice and work pattern differences between male and female orthodontists in Canada? (i.e. Number of hours worked per week, number of

weeks worked per year, number of cases started per year, practice design and practice location)

(3) What are the differences between male and female orthodontist's family structure and does this affect work pattern practices in Canada? (i.e. marital status, spousal employment, number and age of children)

PRIMARY OBJECTIVES

- Identify and examine current practice characteristics of orthodontists working within Canada
- Identify demographic and familial structure patterns of male and female orthodontists in Canada
- Identify practice characteristic differences between male and female orthodontists in Canada
- Identify factors that could be shaping the feminization of orthodontics in Canada (i.e. immigration and location of training)

SECONDARY OBJECTIVES

- Identify factors, other than sex, that may influence work patterns amongst orthodontists in Canada
- Provide information to speculate potential professional changes that may occur as a result of the increase in females practicing orthodontics in Canada

If female orthodontists practice substantially different from men, then continuously increasing the number of women specializing in orthodontics could provoke change in the profession. Our regulating bodies and schools, could use the results of this research to identify projected practice and work pattern trends that may be expected as a consequence of the increased number of female orthodontists in the workforce.

CHAPTER 3: METHOD OF INQUIRY

TARGET POPULATION

The estimated number of orthodontic specialists in Canada is 799, as identified by provincial licensing boards' lists of registered orthodontists, supplemented with the Canadian Association of Orthodontists member directory and American Association of Orthodontists Canadian member directory as of August 16, 2012. From this list, the sex of the orthodontic specialist was determined by the graduate investigator using one of two methods: the first, by using the individuals' first name as a sex indicator, the second, through the use of Internet searches to identify websites or available online information. From this information, it is estimated that 191 orthodontic practitioners in Canada are female (23.9%) and 608 are male (76.1%).

DEVELOPMENT OF THE SURVEY

The questionnaire was developed based on a previously published study comparing male and female practice pattern differences among orthodontists in the United States[49] and a revised questionnaire was given to a group of five local orthodontists to check for question error and relevancy. Following the pilot study, minor amendments were made and the final questionnaire was produced (Appendix L).

The questionnaire, and all correspondence were translated professionally from English to French (Les transductions Delorme Caron, QC) to minimize potential language barriers for respondents (Appendices F-M). Three of the five orthodontists involved in

the pilot study group were bilingual, they completed the survey in both English and French, and responses were compared to ensure the accuracy of the translation.

The questionnaire, was developed to obtain information regarding demographics, practice characteristics, current work, employment situations, general practice pattern information, leaves of absences and vacation time taken each year. Additionally respondents were asked to identify why they chose orthodontics as a specialty, their job satisfaction, work history and planned age of retirement. Non-practice owners were asked their future plans for practice and employment design, while current practice owners were asked to provide information regarding the number of employees and associates, and any sex preference of future associates. Space was provided at the end of the survey to provide additional comments.

DERIVING THE SAMPLE

From the 799 orthodontists, a sample size of 378 was determined to be adequate for statistical power; based on a 5% margin of error, 95% confidence interval and estimated response variation of 50%[58], and an expected response rate of 68.8%, estimated using the lowest response rate of previous studies assessing work and practice-pattern variations between female and male orthodontists[46-49]. To ensure quota sampling and prevent overrepresentation of either sex, this sample size was divided into a target sample of 89 (23.9%) female and 289 (76.1%) male orthodontists.

To ensure accurate regional representation, the list of practicing Canadian orthodontists was stratified by province and grouped into Regions of Canada, using their primary practice address (Table 1). The proportion of orthodontists within each region was calculated. Using these proportions, the sample size for orthodontists, both male and female, were determined within each Region of Canada. This was to obtain an accurate representation of the Canadian orthodontist population to allow not only sex comparisons, but also regional comparisons, where applicable.

Table 1: Regional population breakdown, stratified by sex of orthodontist

Region	% CDN Population	Regional % Female	Regional % Male
B.C.	16.11	24.6	75.4
A.B.	11.31	20.9	79.1
S.K. & M.B.	5.41	10	90
O.N.	43.42	20.7	79.3
Q.C.	17.71	32.8	67.2
Atlantic (N.B., N.L., N.S. & P.E.)	6.03	30.4	69.5

*As Northern Region only has 4 orthodontists, all of which practice in satellite clinics, this region was removed from the analysis

The sample was determined by numbering the lists of orthodontists, which had been stratified according to region of primary practice address and sex, and using a random number generator (SPSS Version 20.0, Chicago, IL) to determine the survey respondents: 378 surveys were sent to the orthodontists.

Where addresses were provided on provincial and national registries they were assumed to be current. If discrepancies existed, or an address was not listed, an Internet search was completed to obtain the most current address, when possible.

For survey implementation and data analysis, two distinct Microsoft Excel databases were created to ensure participant confidentiality. One database contained all orthodontist contact information such as primary practice address, e-mail address and telephone number; each orthodontist selected for survey participation received a unique code that was contained within this database. The second database consisted of survey responses without any personal identifiers to respect participant confidentiality.

IMPLEMENTATION OF THE SURVEY

Following approval from the University of Alberta's Research Ethic Board, orthodontists selected for survey participation received a copy of the survey package through regular mail, addressed to their primary practice address, and, where e-mail addresses were available, through e-mail with a URL link to access the survey's internet-based version (Survey Monkey, Palo Alto, CA). The survey package consisted of a letter of introduction, hand-signed letter with a URL address and instructions for the online questionnaire access, a copy of the questionnaire and a self-addressed stamped return envelope (Appendices F-M); participants in the province of Quebec received all correspondence in both English and French. Additionally, a link was available on both internet-based versions of the questionnaire to allow the respondent to complete the survey in the language of their preference. Each survey was linked to an identification marker in the upper right hand corner of the questionnaire, body of the e-mail and information letter for online survey access, to differentiate respondents from non-respondents. The

decision to have both mail and internet-based versions of the survey was to ensure ease of survey assess and increase the likelihood for survey response.

On April 2, 2013, the initial e-mail information package was sent to 326 of the 378 selected survey participants, while the mailed survey packages were sent to all selected participants by April 17, 2013. A second "reminder" package was sent to non-respondents; on May 15, 2013, a "reminder" e-mail was sent to 194 survey participants, while 215 participants received a second "reminder" mail package by May 27, 2013. After the second mailing, interested participants were asked to complete their survey by June 15, 2013. Lastly, following primary data analysis it was determined that the response rate from the female orthodontists in the Eastern region was not representative of the population. Therefore, an e-mail information package was sent to the remaining 6 female orthodontists practicing in the Eastern region on July 3, 2013, in an attempt to obtain a representative sample; increasing the total number of surveys sent to 384.

DATA ANALYSIS

For mail-based surveys the data was manually entered, while web-based survives were automatically compiled into Microsoft Excel 2011 spreadsheets (Microsoft, Redmond, WA). Manually entered data were checked twice to ensure data entry accuracy and web-based surveys were inspected to ensure that recorded data were relevant to questions asked (i.e. numerical versus nominal responses). Following which, both

spreadsheets were combined. All data analyses were performed using SPSS version 20.0 (SPSS, Chicago, IL). Prior to completing testing, statistical significance, model assumptions were evaluated. For all tests, statistical significance was set at α=0.05.

The Results of the survey were analyzed and grouped into to 6 main categories, with associated sub-categories. The Resulting Categories of Analysis included:

1) Demographics:	(i) Provincial and Regional Distribution (ii) Age (iii) Age at Graduation (iv) Marital Status (v) Spousal Employment (vi) Number of Children
2) Practice Information:	(i) Practice Type (ii) Number of Offices (iii) Ownership Status (iv) Associateship Status
3a.) Practice Activity:	(i) Hours Worked (ii) Days Worked (iii) Patient Flow
3b.) Practice Information for Practice Owners:	(i) Number of Employees and Associates (ii) Associate Preferences
4) Personal Vacation and Leaves of Absences:	(i) Personal Vacation (ii) Leaves of Absence
5) Additional Information:	(i) Retirement (ii) Satisfaction of Orthodontics (iii) Reason for Choosing Orthodontics
6) Work Patterns of Male and Female Orthodontists in Canada:	(i) Analyzing Sex, Number of Children and Age (ii) Analyzing Sex, Children Living at Home and Age

Descriptive statistics were generated for each variable, including means, standard deviation, standard error, medians, ranges and total number of respondents. Cross-

tabulations, with sex as the independent variable, were created, when applicable.

When appropriate, contingency tables were formulated and Pearson Chi-square values and probabilities were computed to determine the statistical significance of differences in proportions of specific variables, stratified by sex. In the comparison of means, ANOVA analysis was used to determine the statistical significance in the differences of specific variables, as stratified by sex. When multiple means were compared, a one-way ANOVA in conjunction with Bonferroni post-hoc test was used. When equal variances between the two populations were not satisfied the data were compared using either the Tamhane's post-hoc test or completing log-linear transformation.

The work patterns of Canadian orthodontists were evaluated, using the number of hours worked per week, number of patients seen per workday, and number of new case starts per year (in 2012) as the response variables. The effects of sex on work patterns were evaluated; applying age and number of children or age and children living at home as covariate's in the analysis. For these analyses a Multivariate Analysis of Covariance (MANCOVA) in conjunction with post-hoc Bonferroni test was completed.

Predictive Variable: Sex (Two discrete categories)

Response Variables: Hours worked per week, Patients seen per workday and number of new case starts per year (2012) (continuous variables)

Covariates: 1) Age & Number of Children 2) Age & Children Living at Home (Yes/No)

As the number of female orthodontists was significantly less than the total number of male orthodontists in the survey sample (27 and 134 respectively), an overall analysis was completed, followed by selecting a random sample of 40 male respondents, to maintain the number of male respondents at one and a half times the number of female respondents, in order to increase statistical power. This random sample analysis was repeated 20 times and compared to an analysis completed on the entire population (27 women and 134 men). Similar trends resulted from the repeated random samples and overall analysis, consequently, as the overall population analysis compares all of the information collected from the survey, this analysis was used in discussing the results.

CHAPTER 4: RESULTS

RESPONSE RATE

The survey response was calculated as of July 28, 2013. From the original mailing of 384, 6 questionnaires were returned to the graduate student due to incorrect address (3 male, 3 female), an e-mail address could not be found to contact these individuals; additionally, 7 orthodontists who received the survey contacted the graduate student or completed the questionnaire to indicate that they had retired (6 male, 1 female). Consequently, the final sample size for the survey was 371 (280 male, 91 female).

To determine the response rate the data were screened for duplicates. Nine orthodontists completed both the online and mail-based versions of the questionnaires. The duplicate surveys were compared for similarity of responses (See Table 2). On average, the duplicate surveys were identical for 78% of the information collected, with a range of 64-87%. All duplicate surveys had discrepancies in the ranking of reasons for choosing orthodontics as a profession, and there were commonly small discrepancies in the reported numbers for practice activity, such as hours worked per week, patients seen per day and new phase II case starts per year. Duplicate surveys were also returned with incomplete information in one of the two surveys submitted. Although the duplicate surveys had discrepancies in responses, they were minimal, and overall the duplicate surveys had similar responses. The version of the survey containing the most information was kept for data analysis.

Table 2: Comparison of responses of surveys submitted in duplicate (both online and mail-based)

	Identical Response		Different Response		Field Blank in one Survey
	Count	%	Count	%	
1	27	87	4	13	8
2	16	72	6	28	20
3	23	72	9	28	3
4	27	79	7	21	4
5	30	86	5	14	3
6	28	78	8	22	9
7	21	64	12	36	5
8	28	85	5	15	4
9	30	81	7	19	3

*All surveys do not have a similar number of total responses, as some questions did not apply to all respondents, or respondents left the question unanswered

Overall, the survey received 207 responses (53.9% response rate), of which 94 were completed online (45.4%) and 113 were mailed to the graduate student (54.6%). Of the respondents, 160 were male (77.3%) and 42 were female (20.3%). The male response rate was 57.1%, and the female response rate was 46.2% (See Table 3).

Table 3: Survey responses from first and second mailings according to version of survey completed (online or mail-based)

	Online		Mail-Based		Total	
	Count	%	Count	%	Count	%
First Mailing	69	43.9	88	56.1	157	75.8
Second Mailing *	25	50.0	25	50.0	50	24.2
Total	94	45.4	113	54.6	207	100

*Including online responses from an e-mail sent to all female orthodontists (not included in the original randomly selected sample) practicing in Eastern Canada (July 3, 2013).

1) DEMOGRAPHICS

i) PROVINCIAL AND REGIONAL DISTRIBUTION

To analyze the data, Canada was divided into six regions, rather than provinces, in an attempt to equalize the distribution of orthodontists by combining smaller provinces into a single region. Apart from Nunavut, the Northwest and Yukon Territories, in which no respondents currently have a primary practice, the smallest number of responses for both men and women were for the Manitoba/Saskatchewan Region (10 males, 1 female). The largest number of female respondents was from the Quebec region (14), while the largest number of male respondents arose from the Ontario region (71). For all regions the number of male respondents was greater than the number of female respondents. (See Appendix N)

ii) AGE

The average age of all respondents was 51 years, with a standard error of 0.9. The age range for men was 29-77, with an average age of 52.3 years (median 52). The age range for female women was 32-65, with an average age of 46.4 years (median 45). The average age differed significantly between the sexes, men were found to be, on average, 5.9 years older than women ($p=0.002$). (See Table 4)

iii) AGE AT GRADUATION

The age at graduation from dental school and orthodontic training were similar for men and women (Table 4). The average age at graduation from dental school of all

respondents was 25.6 years (p=0.900), while the average age at graduation from orthodontic training was 31.4 years (p=0.335), with no significant differences between the sexes.

Table 4: ANOVA statistics and mean age of respondents: in 2013; at graduation from dental school; completion of orthodontic training; at which they had their children; and planned retirement

	Male			Female			Total			
	Mean	Median	Std. Error	Mean	Median	Std. Error	Mean	Median	Std. Error	p-value
Current	52.3	52.0	0.9	46.4	45	1.4	51.2	51.0	0.9	0.002
Dental School	25.6	25	0.25	25.5	24	0.72	25.6	25	0.25	0.900
Ortho Training	31.5	32	0.36	30.7	31	0.56	31.4	31.5	0.31	0.335
Child 1	30.8	30.5	0.46	31.8	33	0.96	31.0	31	0.41	0.976
Child 2	33.6	33	0.40	33.6	34	0.92	33.6	33	0.36	
Child 3	35.8	35	0.64	34.2	35	1.21	35.6	35	0.58	-
Child 4	38.3	37	1.48	32	32	3.0	37.6	37	1.41	-
Child 5	33.7	36	2.33	37	37	N/a	34.5	36	1.84	-
Child 6	35.7	37	1.86	N/a	N/a	N/a	35.7	37	1.86	-
Child 7	41	41	N/a	N/a	N/a	N/a	41	41	N/a	-
Planned Retirement Age	64.1	65	0.590	61.1	61	0.821	63.5	65	0.503	0.013

iv) LOCATION OF TRAINING

The respondents primarily graduated from Canadian dental schools and orthodontic training programs (See Table 5). Overall, 174 (87.4%) of respondents obtained their dental degree in Canada, 14 (7.0%) in the United States and 11 (5.5%) outside Canada and the US; responses included France, England Germany, Malaysia, Mexico, Greece, India, Peru, Sweden, and Egypt. Compared to dental school, fewer respondents obtained their specialty training in Canada (137 or 68.5%), while 60 (30.0%) obtained

their orthodontic degrees in the U.S. and 3 (1.5%) outside of North America, in Egypt, India, Sweden, Australia and the U.K. To analyze the data between the sexes, the respondents were grouped into two categories “Canada” and “Other”; no significant differences existed between male and female orthodontists with respect to Country of obtaining either their dental degree or orthodontic training (p>0.5) (See Table 6).

Table 5: Summary of Personal Demographics of Respondents

	Male		**Female**	
	Count	**%**	**Count**	**%**
Location of Training Dental				
Canada	139	88.0	35	87.4
U.S.	12	7.6	2	7.0
Other	7	4.4	4	5.5
Location of Training Ortho				
Canada	109	68.6	28	68.5
U.S.	47	29.6	13	31.7
Other	3	1.9	0	0.0
Marital Status				
Single	15	9.4	6	15.0
Divorced	7	4.4	2	5.0
Married	126	79.2	28	70.0
Separated	3	1.9	1	2.5
Common-Law	7	4.4	3	7.5
Widowed	1	0.6	0	0
Spousal Employment Status				
Full Time	35	25.2	31	93.9
Part Time	63	45.3	1	0.6
Not Currently Employed	41	29.5	1	0.6
Spousal Occupation				
Student	1	0.8	0	0
Dentist	18	13.7	18	54.5
Physician	6	4.6	0	0
Houseparent/Homemaker	27	20.6	0	0
Other Health Profession	27	20.6	2	6.1
Non-health Professional	16	12.2	7	21.2
Non-Health Other occupation	33	26.0	6	18.2
Other	2	1.5	0	0

Number of Children				
0	21	13.7	5	13.9
1	10	6.5	7	19.4
2	59	38.6	14	38.9
3	47	30.7	7	19.4
4	13	8.5	2	5.6
5	0	0	1	2.8
6	2	1.3	0	0
7	1	0.7	0	0

Table 6: Chi-Square test comparing differences between male and female orthodontists for country in which their dental degree and orthodontic training were completed

		Male	Female	p-value
Dental Degree	**Canada**	139	35	0.653
	Other	19	6	
Ortho Training	**Canada**	109	28	0.974
	Other	50	13	

v) MARITAL STATUS

Of the 199 respondents for this question, 154 were married (126 male, 28 female), 21 were single (15 male, 6 female), 9 were divorced (7 male, 2 female), 4 separated (3 male, 1 female), 10 common law (7 male, 3 female) and 1 male was widowed. When the data were analyzed using two categories (married and unmarried), it was found that males and females were equally likely to be married (p=0.212)(See Tables 5 & 7).

Table 7: Chi-Square test comparing differences between male and female orthodontists for marital status (married vs. unmarried)

	Male		Female		p-value
	Count	**%**	**Count**	**%**	
Married	126	79.2	28	70.0	0.212
Unmarried	33	20.8	12	30.0	

vi) SPOUSAL EMPLOYMENT

Spouses of male orthodontists were less likely to work full time than spouses of female orthodontists. Of the 33 married female respondents, 31 (93.9%) reported full time spousal employment, while 1 female respondent reported having a spouse that is employed part time, and 1 female respondent reported having a spouse that is not currently employed. Of the 139 married male respondents, 63 (45.3%) reported having spouses that are employed part time, 41 (29.5%) reported having a spouse that is not currently employed, and 35 (25.2%) reported full time spousal employment (25.2%) (See Table 5).

The occupation of the spouses was analyzed; a summary of the results can be viewed in Table 5. Female respondents spouses were most likely to be dentists, including dental specialists (54.5%), followed by non-health professional (21.2%), non-health other occupation (18.2%), and other health profession (6.1%). Male respondents spouses were most commonly employed in non-health other occupation (26.0%), followed by other health professional (20.6%), houseparent/homemaker (20.6%), dentist (13.7%), non-health professional (12.2%), physician (4.6%), other occupation, unspecified, (1.5%) and lastly student (0.8%). For both male and female respondents, the most common reported non-health other occupation was office manager/administrative duties and bookkeeper.

vii) NUMBER OF CHILDREN

A summary table of the number of children (including step-children) of respondents can be viewed in Table 5. The number of children for male respondents ranged between 0-7, while the range of number of children for female respondents was 0-5. When the data were analyzed using four categories (childless, 1 child, 2 children and 3 or more children), there was no significant differences between the sexes (p=0.157), that is, neither sex was more likely than the other to have a fewer or greater number of children (See Table 8). There was no significant difference between male and female respondents with respect to the average number of children (p=0.189) (See Table 9). The average number of children for both men and women was 2.2 (median 2).

Table 8: Chi-Square test comparing differences between male and female orthodontists for number of children (childless, 1 child, 2 children and 3 or more children)

	Male		Female		p-value
	Count	%	Count	%	
Childless	21	13.7	5	13.9	0.157
1 Child	10	6.5	7	19.4	
2 Children	59	38.6	14	38.9	
3 or More Children	63	41.2	10	27.8	

Table 9: Average number of children (including step-children) of male and female respondents

	Male			Female			Total			
	Mean	Median	Std. Error	Mean	Median	Std. Error	Mean	Median	Std. Error	p-value
No. of Children	2.2	2	0.101	1.9	2	0.209	2.16	2	0.091	0.189

The mean age at which both male and female orthodontists had their first and second child(ren) did not differ significantly between the sexes (p=0.976). The mean age at

which female orthodontists had their first and second child(ren) was 31.8 and 33.6 years respectively. The mean age at which male orthodontists had their first and second child(ren) was 30.8 and 33.6 years respectively (See Table 4).

2) PRACTICE INFORMATION

i) PRACTICE TYPE

When asked to identify their current practice type, there were 202 respondents (160 men, 42 women). Men were most likely to practice as solo practitioners (65%), followed by working in a group practice limited to orthodontics (28.8%). Seventeen men indicated that they provide orthodontic services in general dental practice (10.6%), and 17 men work as an educator (10.6%). Fourteen men practice with other specialties (8.8%), 5 men work as researchers (3.1%) and 5 men selected "other" (3.1%), while 1 man indicated that he does not currently work. Twenty women (47.6%) indicated that they work as a solo practitioner and 20 women (47.6%) work in a group practice limited to orthodontics, which were the most common working arrangements for female orthodontists. Seven women respondents currently work as an educator (16.7%); 4 provide orthodontic services in a general dental practice (9.5%); 3 women work in a group practice with other specialties (7.1%); 3 women selected "other" (7.1%); and only one female respondent selected researcher (2.4%). No female respondents indicated that they were not currently working. When "other" was selected as a current work arrangement, 3 men and 3 women indicated that they worked in a hospital, while one man indicated that he was also practicing as a general dentist, and one man indicated

that he was "pre-retired" (See Table 10). When analyzing the data in two practice categories (Solo Practitioner versus Other, including all forms of group practice: working in a general dental office; as an educator; researcher; not currently in practice; or other), there was weak evidence of a significant difference between the sexes (p=0.061); indicating that men are more likely to work as a solo practitioner than another working arrangement than their female colleagues (See Table 11).

Table 10: Practice Information of Respondents

	Male		**Female**	
	Count	**%**	**Count**	**%**
Practice Type *				
In a group practice limited to orthodontics	46	28.8	20	47.6
In a group practice with other specialties	14	8.8	3	7.1
Providing orthodontic services in general dental practice	17	10.6	4	9.5
As a solo practitioner	104	65	20	47.6
As an educator	17	10.6	7	16.7
As a researcher	5	3.1	1	2.4
Do not currently practice	1	0.6	0	0
Other	5	3.1	3	7.1
Number of Offices				
0	0	0	1	2.5
1	84	54.2	21	52.5
2	45	29.0	14	35.0
3	20	12.9	3	7.5
4	3	1.9	0	0
5	1	0.6	0	0
6	1	0.6	0	0
21	0	0	1	2.5
28	1	0.6	0	0
Size of Community				
Rural (>20,000)	6	3.8	1	2.4
Small City (20,001-50,000)	19	11.9	4	9.8
Large city (50,001-500,000)	65	40.6	16	39
Metropolitan (>500,000)	70	43.8	20	48.8
Ownership Status				
Owns an orthodontic practice	123	76.9	30	71.4
Owns part of an orthodontic practice	18	11.2	6	14.3

	Male		Female	
	Count	%	Count	%
Owns an orthodontic practice and part of an orthodontic practice	6	3.8	1	2.4
Non-owner	13	8.1	5	11.9
Reason to Work as Associate				
Allows increased time/flexibility to allocate time for other priorities	20	19.8	4	13.8
Prefer not to make geographic commitment	10	9.9	1	3.4
Not interested in practice ownership	4	4.0	1	3.4
Unprepared to make financial commitment to ownership	33	32.7	11	37.9
Other	34	33.7	12	41.4
Orthodontists currently working as employee or associate				
Currently working on salary, commission, as an employee or associateship	39	24.4	11	26.2
Currently working as an associate while primary office is not at full capacity	14	8.8	6	14.3

*Percentages do not add to 100%, as respondents were able to select any or all of the selections that currently apply to them

Table 11: Chi-Square test comparing Practice Type of male and female orthodontists (Solo Practitioner versus all other arrangements)

Practice Type	Males (Count)	Females (Count)	p-value
Solo Practitioner	104	20	0.061
All Other Arrangements	105	38	

ii) NUMBER OF OFFICES

The most common number of offices worked for both men and women was one (84 men (54.2%), 21 women (52.5%)), followed by two (45 men (29%), 14 women (35%)) and three (20 men (12.9%), 3 women (7.5%)) offices (See Table 10). There was no significant difference in the mean number of offices worked in for men and women (p=0.241). Men, on average, worked in 1.7 offices and women worked in an average of 1.5 offices (See Table 12). When the data were analyzed using three categories (one office, two offices and three of more offices), there was no significant differences

between the sexes (p=0.512), that is, neither sex was more likely than the other to work in fewer or greater number of offices (See Table 13).

Table 12: Mean number of offices worked in for male and female orthodontists

	Male			Female			Total			
	Mean	Median	Std. Error	Mean	Median	Std. Error	Mean	Median	Std. Error	p-value
No. of Offices	1.67	1	0.073	1.5	1	0.109	1.62	1	0.061	0.241

*Analyzed with outliers (21 and 28 offices) removed

Table 13: Chi-Square test comparing the number of offices for male and female orthodontists

Number of Offices	Male		Female		
	Count	%	Count	%	p-value*
1	84	54.2	21	52.5	0.512
2	45	29.0	14	35.0	
3 or more	26	16.8	4	12.5	

iii) OFFICE LOCATION

The location of the main office was similar for both sexes. Both men and women were most likely to work in a metropolitan area (70 men (43.8%); 20 women (48.8%)). The second most common office location for both men and women was in a large city (65 men (40.6%); 16 women (39%)), followed by a small city (19 men (11.9%); 4 women (9.8%)); and in a rural area (6 men (3.8%); 1 woman (2.4%). When analyzing the data using three categories (metropolitan, large city and small city/rural) there were no significant differences between the sexes (p=0.794) (See Table 14).

Table 14: Chi-Square test of size of community of main office location for male and female orthodontists

Size of Community	Male		Female		
	Count	%	Count	%	p-value*
Small City /Rural (>50,000)	25	15.7	5	12.2	0.794
Large city (50,001-500,000)	65	40.6	16	39	
Metropolitan (>500,000)	70	43.8	20	48.8	

iv) OWNERSHIP STATUS

The ownership status was similar for both sexes. Both men and women most commonly owned an orthodontic practice (123 men (76.9%); 30 women (71.4%)). The second most common ownership arrangement was owning part of an orthodontic practice (19 men (11.2%); 4 women (14.3%)), followed by non-owner (13 men (8.1%); 5 women (11.9%)). The least common type of ownership status was owning an orthodontic practice and part of an orthodontic practice (6 men (3.8%), 1 woman (2.4%)) (See Table 10). When analyzing the results in two categories (owning an orthodontic practice (including owning all of a practice in combination with part of a second practice) versus non-owner, there were no significant differences between the sexes (p=0.588)(See Table 15).

Table 15: Chi-Square test of ownership status of male and female orthodontists

Ownership status	Male		Female		
	Count	%	Count	%	p-value*
Owns all or part of an orthodontic practice	147	91.9	37	88.1	0.588
Non-owner	13	8.1	5	11.9	

v) ASSOCIATESHIP STATUS

When asked if they had ever worked as an orthodontic associate, 202 responses were received (160 men, 42 women). There was weak evidence of a significant difference between the sexes for previously working as an orthodontic associate (p=0.083) (See Table 16). Ninety men (53%) and 16 women (38%) indicated that they had never worked as an associate in their orthodontic career, while 74 men (46.8%) and 26 women (61.9%) indicated that they had previously worked as an orthodontic associate (See Table 10). However, the number of years worked as an associate did not differ significantly between the sexes (p=0.545), the average length of associateship for men was 4.4 years and 5.1 years for women (See Table 17). The most common reason for both men and women for choosing to work as an orthodontic associate was stated as "other", with 33.7% of men and 41.4% of women respondents selecting this option. Common reasons indicated were to gain both clinical and business experience, as a transition into purchasing the practice/retirement, and to supplement income. The second most common reason for choosing to work as an associate for both men and women was unpreparedness to make the financial commitment to ownership (men 32.7%, women 37.9%), followed by allowing increased time and flexibility to allocate time for other priorities (men 19.8%, women 13.8%). Ten men (9.9%) and 1 woman (2.0%) indicated that the reason for choosing to associate was for either unwillingness to make a geographic commitment; 4 men (4.0%) and 1 woman (2.0%) selected lack of interest in ownership. Of the respondents, 39 men (24.4%) and 11 women (26.2%) indicated that they were currently working on salary, commission, as an employee or

associateship basis; of those, 14 men and 4 women indicated that they are currently working as an associate while their primary office is not at full capacity (See Table 10).

Table 16: Chi-Square test of associateship status of male and female orthodontists

	Male		Female		
	Count	**%**	**Count**	**%**	**p-value**
Has never worked as an orthodontic associate	84	53.2	16	38.1	0.083
Has worked or Is currently working as an orthodontic associate	74	46.8	26	61.9	

Table 17: Mean length of associateship for male and female orthodontists

	Male			Female				Total		
	Mean	Median	Std. Error	Mean	Median	Std. Error	Mean	Median	Std. Error	p-value
Length of Associateship	4.4	3.0	0.578	5.1	3.0	1.14	4.54	3.0	0.489	0.545

3 a) PRACTICE ACTIVITY

This section describes the results of the practice activity section of the survey: sex-specific comparisons for number of hours worked per week, number of patients seen per workday, and number of phase II case starts in 2012.

i) HOURS WORKED

On average, there were no significant differences between men and women for the number of hours per day in direct patient care, performing all other office duties or doing paperwork at home (p=0.465). This question received 199 responses (158 men, 41 women). The average number of hours worked in a typical workday was 8.6 hours for men and 9.0 hours for women. On average, men spent 29 hours per week in direct

patient care and women spent 28 hours. Men spent 5.9 hours per week performing all other office duties, while women spent 6.7 hours. Men were found to spend 3.7 hours per week doing paperwork at home, and women were found to spend 4.4 hours per week (See Table 18).

ii) DAYS WORKED

On average, there were no significant differences between men and women for the number of days worked per week (p=0.150). This question received 198 responses (157 men, 41 women). Canadian orthodontists were found to work an average of 4 days per week; men were found to work an average of 4 days per week, and women worked an average of 3.8 days (See Table 18).

iii) PATIENT FLOW

When asked how many patients they typically see in an average workday 194 orthodontists provided a response (155 men, 39 women). The mean number of patients seen per workday for Canadian orthodontists was 55. Men were found to see an average of 55 patients per workday, with a range of 2 to 125, and women 57 patients, with a range of 10 to 125 (See Table 18).

When asked the total number of phase II case starts in 2012, 172 responses were received (141 men, 31 women). The average number of phase II case starts for Canadian orthodontists in 2012 was 195. Men were found to start an average of 200

patients in 2012, with a range of 5-750 cases, and women started 173 new phase II cases, with a range of 13-400 cases (See Table 18).

Of the 24 orthodontists who indicated that they work in a group practice that shares patients (16 men, 8 women), the average number of phase II case starts in 2012 was 279. Men sharing patients started a combined average of 310 patients (median 300), with a range of 40-750 cases, and women sharing patients started a combined average of 219 patients (median 212.5), with a range of 50-300 cases (See Table 18).

Table 18: Summary of practice activity indicators for men and women

	Male				Female				Total			
	Mean	Median	Std. Error	Count	Mean	Median	Std. Error	Count	Mean	Median	Std. Error	p-value*
Hours / workday (all requirements)	8.6	8.0	0.137	158	9.0	8.9	0.268	41	8.6	8.0	0.489	0.465
Hours/wk all other office duties	5.9	4.5	0.453	158	6.7	6.0	0.884	41	6.1	5.0	0.403	
Hours/wk work home	3.7	3.0	0.339	158	4.4	3.0	0.660	41	3.8	3.0	0.301	
Hours /wk in direct patient care	29.0	30	0.618	158	28.0	30	1.205	41	28.8	30	0.549	-
Days worked/wk	4.0	4.0	0.74	157	3.8	4.0	0.130	41	4.0	4.0	0.64	0.150
Patients/day	54.5	50	1.965	155	57.4	50	4.229	39	55.1	50	1.783	-
Phase II starts (2012)	199.6	150	12.0	141	172.7	150	19.79	31	194.7	150	10.46	-
Phase II starts (shared)	309.6	300	41.08	16	218.9	212.5	58.10	8	279.3	262.5	33.99	-

*p-value not calculated for hours/wk in direct patient care, patients/day or phase II starts/year as these variables are assessed in a MANCOVA analysis for practice activity (See Tables 46-49)

3b) PRACTICE INFORMATION FOR PRACTICE OWNERS

Of the 207 respondents, 147 men and 37 women indicated that they owned either all or part of an orthodontic practice. The following section summarizes the results of

questions that were specified to these 184 respondents who are considered practice owners.

i) NUMBER OF EMPLOYEES AND ASSOCIATES

There was no significant difference between the sexes with respect to practice ownership (p=0.588), with 13 men (8.1%) and 5 women (11.9%) in a non-ownership position (Table 15). When the number of employees was evaluated there was no significant difference between the sexes for full or part-time employees (p=0.368). On average, men employ 7.0 full-time and 2.9 part-time employees, while women employ an average of 7.2 full-time and 3.6 part-time employees (See Table 19).

No significant difference existed between the sexes for employing an orthodontic associate (p=0.516). Twenty-one men (15%) and 7 women (19% of) indicated that they employ 1 orthodontic associate. No variation existed between the sexes for the number of employed orthodontic associates; every orthodontist who employs an orthodontic associate only employs one, be it full or part-time (See Table 19).

Table 19: Average number of employees and orthodontic associates for male and female orthodontists

	Male				**Female**				**Total**			
	Mean	Median	Std. Error	Count	Mean	Median	Std. Error	Count	Mean	Median	Std. Error	p-value
Staff												
Full-Time	7.0	6.0	0.453	137	7.2	6.0	1.222	35	7.0	6.0	0.437	0.368
Part-Time	2.9	2.0	0.271	114	3.6	2.0	0.708	27	3.0	2.0	0.258	
Ortho. Associates												
Full-Time	1.0	1.0	0.0	8	1.0	1.0	0.0	2	1.0	1.0	0.0	0.516
Part-Time	1.0	1.0	0.0	16	1.0	1.0	0.0	5	1.0	1.0	0.0	

ii) ASSOCIATE PREFERENCES

When asked whether they had a preference for an associate, male, female or indifferent, there were 153 respondents (122 men, 31 women). Of the respondents, 14 (9.2%) indicated that they would prefer a male associate (13 men, 1 woman), 12 (7.8%) indicated that they would prefer a female associate (8 men, 4 women) and 127 (83%) indicated that they did not have a sex preference for an associate (101 men, 26 women). When asked to explain the reason for their preference, of the 13 men who indicated a preference for a male associate, reasons included (with each comment from a different individual unless otherwise indicated): absence of pregnancy and associated maternity leave (4); greater potential for buy-in (2); reduced involvement in family; lack of reliability for females to prioritize practice over family; "hormones"/less emotional; increased capacity to work; "easier to work with"; ease of professional communication; and ability to "leave the toilet seat up". The woman who indicated a male associate preference, reasoning was to "balance out the practice". Of the 8 men who indicated a preference of a female associate, reasons included (with each comment from a different individual unless otherwise indicated): having someone who would like to work part-time (4); long-term stability (2); being single; and patient preference for female orthodontist in practice. Of the 4 women who indicated a preference for a female associate, reasoning included: personal preference; compatibility; previous bad experience with a male associate; and maintaining a female orthodontic practice. Of the 127 individuals who indicated that they were indifferent to the sex of an associate, the

primary reasoning was that personality and work ethic characteristics were the main priority in determining a potential associate, regardless of their sex.

When asked what characteristics they look for in an associate, the most common responses were: honesty, integrity, dedication, personable, committed, friendly, and hard working. Other responses included, but were not limited to: having similar practice philosophies; commitment to excellence; teach-ability; ethical; calm; wanting to buy in as a partner; clinical experience; and "blood relation".

4) PERSONAL VACATION AND LEAVES OF ABSENCE

i) PERSONAL VACATION

When asked how many weeks of personal vacation they took in 2012, 201 responses were received (158 men, 41 women). In 2012, there were no significant differences in the total weeks of vacation taken between the sexes (p=0.611). On average, Canadian orthodontists took 7 weeks of vacation, with men taking an average of 7.2 weeks, and women an average of 6.7 weeks (See Table 20).

Table 20: Personal vacation in 2012 for male and female orthodontists

	Male				Female				Total			
	Mean	Median	Std. Error	Count	Mean	Median	Std. Error	Count	Mean	Median	Std. Error	p-value
Vacation (weeks)	7.2	6.0	0.400	158	6.7	7.0	0.401	41	7.1	6.0	0.328	0.611

ii) LEAVES OF ABSENCE

Twelve of the respondents (6.0%) indicated that they had taken a leave of absence in 2012, 9 men (5.6%) and 3 women (7.3%). In 2012, the average length of a leave of absence for Canadian orthodontists was 7.1 weeks, with men taking an average of 7.3 weeks and women 6.5 weeks. Of the 13 individuals who had taken a leave of absence in 2012, only one had a child during that year, a female, who took 2 weeks of leave for maternity.

There was a significant difference between the sexes for taking a leave of absence during their career ($p<0.001$). In total 34 individuals indicated that they had taken a leave of absence (16.9%), 16 men (10.0%) and 18 women (43.9%). Of the respondents who took a leave of absence in their career, men took an average of 1.2 total leaves of absence, with women taking an average of 1.6 leaves; this difference was not significant ($p=0.337$). Additionally, there was no significant difference between the sexes for the average length of leave of absence ($p=0.206$). The average length for a leave of absence throughout a career was 13.8 weeks, with men taking an average of 9.6 weeks (Range: 1-26) and women an average of 17.4 weeks (Range: 1-100). Although it was found that the total number of weeks leave of absence over a career increased for women as the number of children increased, the opposite pattern was found for men; the total number of weeks leave of absence over a career was found to be moderately negatively correlated to the number of children for men ($r= -0.424$), and weakly positively correlated for women ($r= 0.279$). The most common reason for men taking a leave of

absence for men was personal illness, followed by extended vacation; for women, the most common reason for taking a leave was maternity, followed by personal illness and child rearing (See Tables 21-23 & Figure 1).

Table 21: Chi-Square test comparing the difference between male and females for having taken a leave of absence (LOA) during their career

	Male		**Female**		
	Count	**%**	**Count**	**%**	**p-value**
Has Taken LOA during Career	16	10.0	18	43.9	<0.001

Table 22: Summary of leave of absence (LOA) results for male and female orthodontists

Leave of absence	**Male**				**Female**				**Total**			
	Mean	Median	Std. Error	Count	Mean	Median	Std. Error	Count	Mean	Median	Std. Error	p-value
Length LOA 2012 (wks)	7.3	8.0	1.167	9	6.7	8.0	2.404	3	7.2	8.0	1.006	*
Length of LOA over career (wks)	9.6	7.0	4.411	16	17.4	8.0	4.158	18	13.8	8.0	3.674	0.206
Total number of LOA (career)	1.2	1.0	0.200	16	1.6	1.0	0.246	18	1.4	1.0	0.174	0.337

Table 23: Average length of leave of absence (weeks) for specific reason for leaves of absence

Reason for Leave	**Male**				**Female**				**Total**		
	Mean	Median	Std. Error	Count	Mean	Median	Std. Error	Count	Mean	Median	Std. Error
Maternity	6.0	6.0	0.0	1	18.1	9.0	6.709	12	17.2	8.0	6.241
Personal Illness	10.6	10.0	2.692	8	12.6	5.0	6.772	5	11.4	8.0	2.925
Child Rearing	N/a	N/a	N/a	0	11.3	8.0	6.566	3	11.3	8.0	6.566
Family Illness	N/a	N/a	N/a	0	1.0	1.0	0.0	1	1.0	1.0	0.0
Extended Vacation	12.0	12.0	8.0	2	N/a	N/a	N/a	0	12.0	12.0	8.0

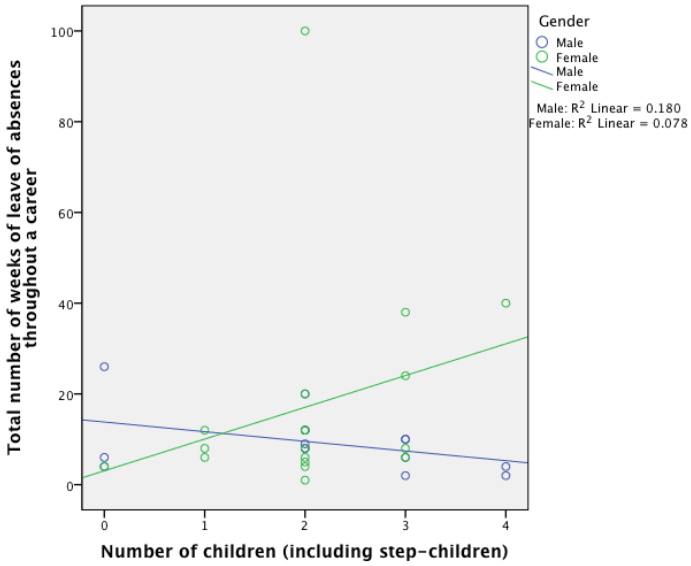

Figure 1: Total number of weeks leave of absence throughout a career compared to the number of children for male and female orthodontists

5) ADDITIONAL INFORMATION

i) RETIREMENT

When asked when they plan on retiring, 188 individuals provided a response (147 men, 41 women); the responses ranged from 43 years of age to "never". Seven of the respondents indicated that they did not plan on retiring (6 men and 1 woman), however for the means of statistical analysis the average retirement age of orthodontists (66.5 years[59]) was used for these individuals response. The average age of planned retirement for Canadian orthodontists is 63.5 years. There was a significant difference between the sexes for planned retirement age (p=0.013); on average, women plan on retiring 3 years earlier than their male counterparts (61 years and 64 years respectively). The age of the orthodontist was found to be moderately correlated to the anticipated age at

retirement (r= 0.679); as the age of the orthodontist increased, the anticipated age at retirement increased. When stratified according to sex, it was found that the age of the orthodontist was strongly correlated to the anticipated age at retirement for men (r= 0.817) and moderately correlated for women (r= 0.386) (See Table 4 and Figures 2-3).

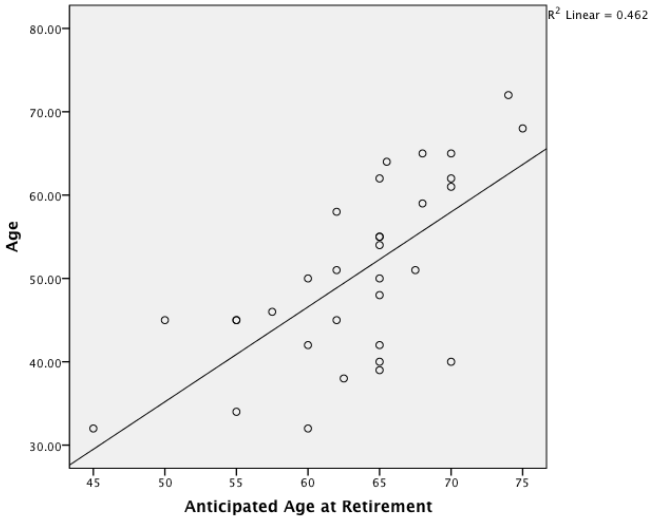

Figure 2: Age of the orthodontist related to the anticipated age at retirement

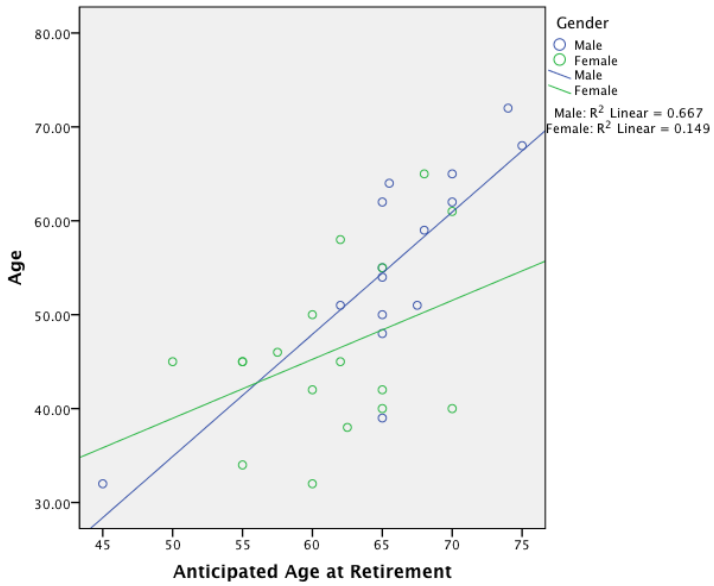

Figure 3: Age of the orthodontist related to the anticipated age at retirement, stratified by sex

ii) SATISFACTION WITH ORTHODONTICS

When asked to rate their satisfaction with the profession of orthodontics, either extremely satisfied, satisfied, moderately satisfied, dissatisfied and extremely dissatisfied, there was no significant difference between the sexes (p=0.508). Overall, 201 respondents answered this question (160 men, 41 women). The majority of respondents (58.2%) indicated that they were extremely satisfied (89 men, 28 women), 34.4% were satisfied (58 men, 11 women), 7.0% moderately satisfied (12 men, 2 women) and 0.5% (1 man) dissatisfied, no individuals indicated that they were extremely dissatisfied with the profession. When analyzing the results in two categories (Extremely satisfied versus "Other"), there were no significant differences between the sexes (p=0.142); that is, neither men nor women were more likely than the other sex, to be extremely satisfied with the specialty of orthodontics (See Table 24).

iii) REASON FOR CHOOSING ORTHODONTICS

When asked why they chose the specialty of orthodontics, the responses were similar for both sexes. Two hundred responses were received for this question (159 men, 41 women). The number one reason for choosing orthodontics as a profession was "Job Satisfaction" (85 men (53.5%), 23 women (54%)), followed by "Career Suits Abilities" (28 men (17.6%), 10 women (25%)) and "Professional Autonomy" (20 men (17.6%), 7 women (17.5%)). "Other" was chosen by 11 men (7.1%) and 4 women (7.7%). When asked to describe the other reasons, the responses included, but were not limited to: connecting with people; working with young people; family members being

orthodontists; enhancing the lives of others; the challenge; technical aspects; personal interest; ability to teach; cleanliness; scientific research; and work/life balance. "Financial Prospects" was the primary reason for 7 men (4.4%) and 2 women (5.0%). "Flexible Working Arrangements" was selected by 9 men (5.7%) and 2 women (4.9%). When analyzing the results in two categories (Primary reason of choosing orthodontics as "Job Satisfaction" versus any other primary reason (Professional Autonomy, Financial Prospects, Career Suits Abilities, Flexible Working Arrangements or Other), there were no significant differences between the sexes (p=0.743) (See Table 24 and Figures 4-9)

Table 24: Summary of satisfaction with orthodontics and primary reasons for choosing orthodontics as a career.

	Male		**Female**		
	Count	**%**	**Count**	**%**	**P-Value***
Satisfaction with the Profession					
Extremely Satisfied	89	55.6	28	68.3	0.508
Satisfied	58	36.2	11	26.8	
Moderately Satisfied	12	7.5	2	4.9	
Dissatisfied	1	0.6	0	0.0	
Extremely Dissatisfied	0	0.0	0	0.0	
Primary Reason for Choosing Orthodontics**					
Job Satisfaction	85	53.5	23	54.0	0.743
Career Suits Abilities	28	17.6	10	25.0	
Professional Autonomy	28	17.6	7	17.5	
Financial Prospects	7	4.4	2	5.0	
Flexible Working Arrangements	9	5.7	2	4.9	
Other	11	7.1	4	7.7	

*P-value for Satisfaction calculated using two categories: 1) Extremely Satisfied, 2) "Any Other Response".
*P-value for Primary Reason for Choosing orthodontics calculated using two groups: 1) "Job Satisfaction" and 2) "Any other reason"
**Percentages do not add to 100% as some individuals indicated more than one first reason for choosing orthodontics

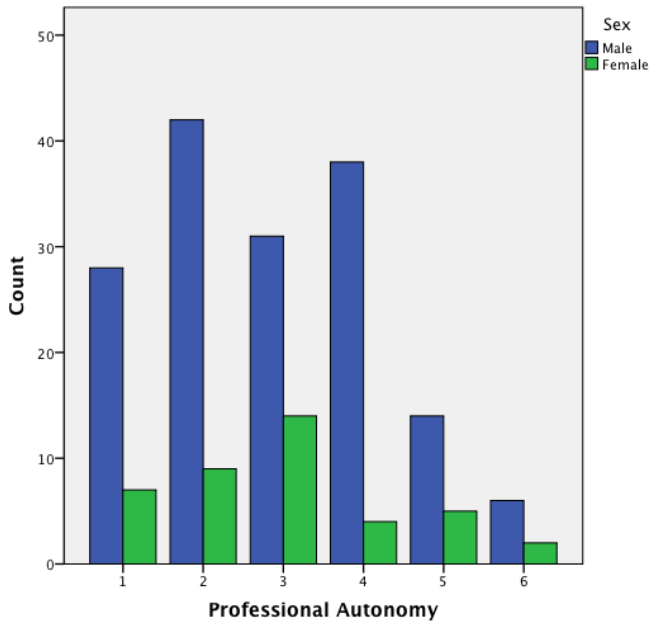

Figure 4: Professional autonomy as choice for specializing in orthodontics (1 being the most important reason and 6 being the least important reason)

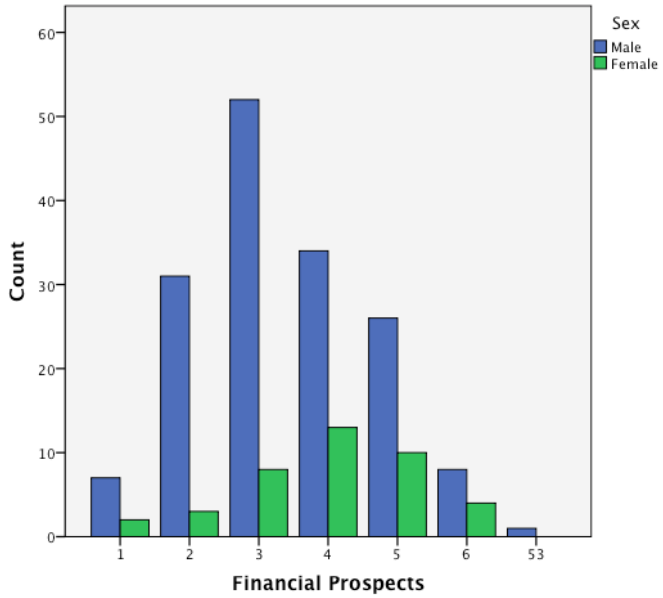

Figure 5: Financial prospective as choice for specializing in orthodontics (1 being the most important and 6 being the least important reason)

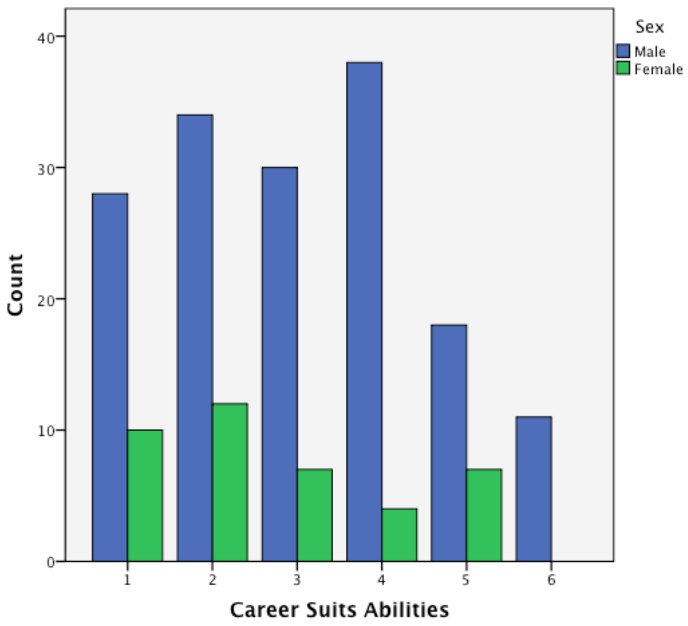

Figure 6: Career suits abilities as choice for specializing in orthodontics (1 being the most important reason and 6 being the least reason)

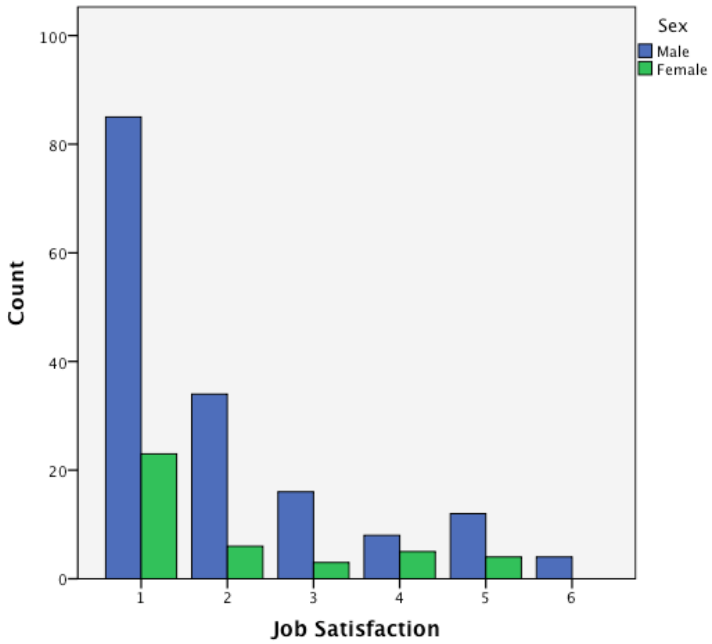

Figure 7: Job Satisfaction as choice for specializing in orthodontics (1 being the most important reason and 6 being the least important reason)

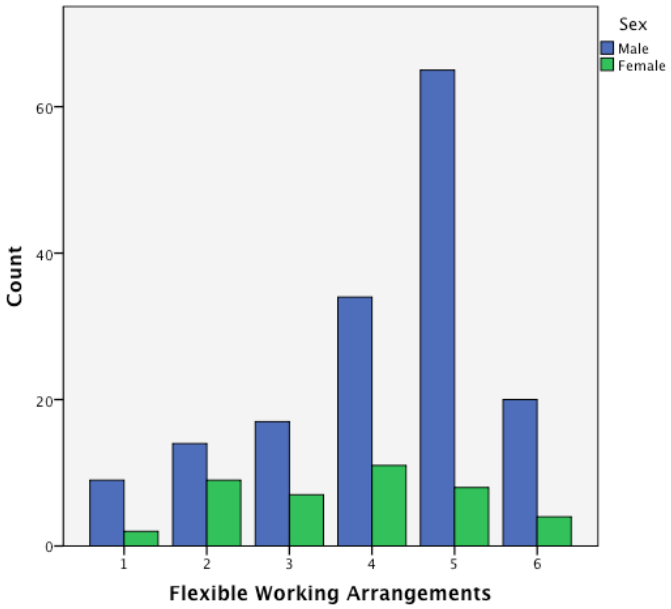

Figure 8: Flexible working arrangements as choice for specializing in orthodontics (1 being the most important reason and 6 being the least important reason)

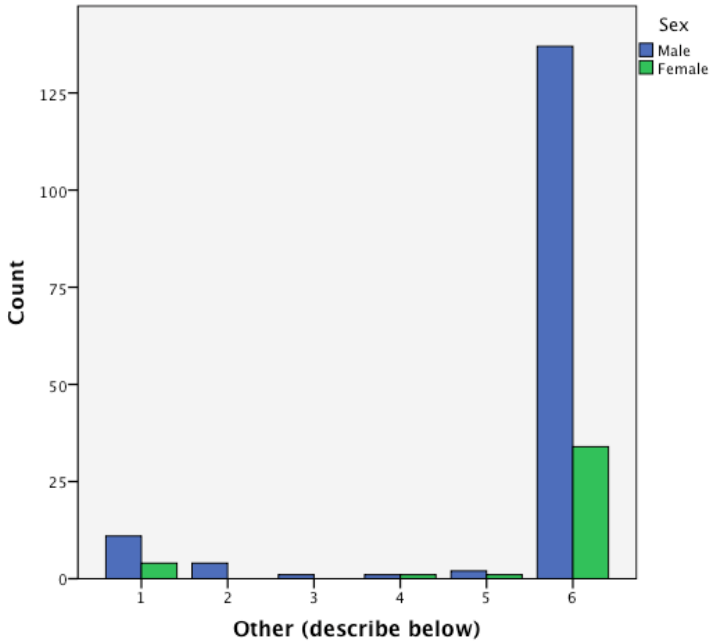

Figure 9: "Other" as choice for specializing in orthodontics (1 being the most important reason and 6 being the least important reason)

6) WORK PATTERNS OF MALE AND FEMALE ORTHODONTISTS IN CANADA

i) ANALYZING SEX, NUMBER OF CHILDREN AND AGE

When analyzing the work patterns of male and female orthodontists, the following response and predictive variables were used, while statistically controlling for the specified covariates.

Predictive Variable: Sex (Two discrete categories)

Response Variables: Hours worked per week, Patients seen per workday and number of new case starts per year (2012) (continuous variables)

Covariates: 1) Age & Number of Children

2) Age & Children Living at Home (Yes/No)

Following the data analysis, the following interactions were found to be insignificant and were consequently removed: number of children, age and sex of the orthodontist ($p=0.114$), sex and age ($p=0.513$), sex and number of children ($p=0.502$), age and number of children ($p=0.166$). Additionally, the number of children was removed from the equation, as it was not found to be significant as a covariate ($p=0.244$). However, there was convincing evidence for the significance of age as a covariate for the number of hours worked per week ($p=0.001$), and number of phase II case starts per year ($p=0.015$); while age was not significant as a covariate for the number of patients seen per day ($p=0.373$) (See Table 25).

When age was statistically controlled (evaluated at 51.1 years), there was weak evidence of a significant difference between the sexes for number of hours worked per week (p=0.071). On average, men spend 29 hours per week in direct patient care, and women 26 hours (95% C.I. [-0.255,6.057]). In analyzing the relationship between age and number of hours worked per week it was evident that a quadratic relationship existed (R^2= 0.135); i.e., age explains 13.5% of the variation in number of hours worked per week for both sexes. In analyzing the relationship, it was evident that the number of hours worked increased with increasing age but peaked at approximately 50 years of age, following which, the number of hours worked per week decreased with increasing age (See Table 26 & Figure 10).

When age was statistically controlled (evaluated at 51.1 years), there was no convincing evidence to indicate a significant difference between the sexes for the number of phase II case starts per year (p=0.128). On average, men started 200 phase II cases in 2012, and women started 155. In analyzing the relationship between age and number of phase II case starts per year, it was shown that a quadratic relationship existed (R^2=0.074); i.e. age explains 7.4% of the variation in number of new phase II case starts in 2012, for both sexes. In analyzing the relationship, it is evident that the number of phase II case starts increased with increasing age until approximately age 50, at which time, the number of case starts decreased with increasing age. However, there is no convincing evidence to suggest a significant relationship between age and the number

of phase II case starts as significant variation exists within the data (See Table 26 and Figure 11).

Lastly, there was no evidence to suggest a significant difference between the sexes for the number of patients seen per day (p=0.504). Men saw an average of 54.5 patients per workday, while women saw an average of 57.4 (See Table 27).

Table 25: Overall MANCOVA results for effect of sex on work patterns (number of hours/week, number of patients/day and number of phase II case starts/year) with age and number of children as covariates

Interaction/Main Effect	p-value	Removed From Analysis
Sex*Age*Number of Children	0.114	Yes
Sex*Age	0.513	Yes
Sex*Number of Children	0.502	Yes
Age * Number of Children	0.166	Yes
Number of Children	0.244	Yes
Age (Patients seen per workday)	0.373	Yes
Age (Hours worked per week)	0.001	No
Age (Phase II starts 2012)	0.015	No

Table 26: MANCOVA results for number of hours worked per week and number of phase II starts in 2012 with age as a covariate

Variable		Mean	Std. Error	P-value	95% C.I.	
					Lwr Bound	Upr Bound
Hours per week	Male	29.3	0.642	0.071	-.255	6.057
	Female	26.4	1.452			
Phase II starts	Male	199.8	11.747	0.128	-12.982	102.441
	Female	155.1	26.560			

*Evaluated at age= 51.10

Table 27: ANOVA results for average number of patients seen per workday

	Mean	Std. Error	P-value	95% confidence Interval	
				Lwr Bound	Upr Bound
Male	54.5	2.0	0.504	-11.766	5.805
Female	57.4	4.0			

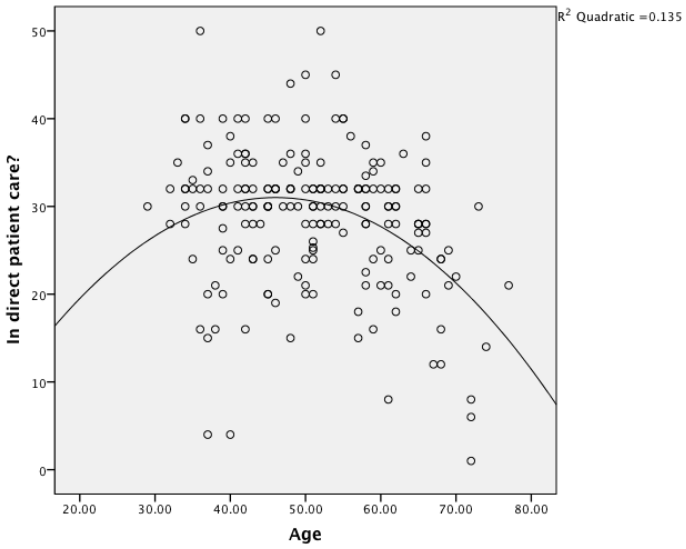

Figure 10: Scatterplot (with fitted quadratic equation) of age versus number of hours in direct patient care

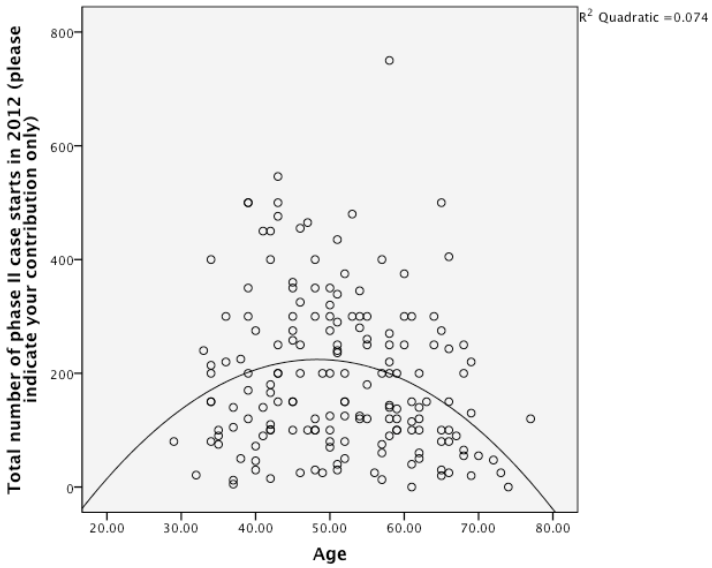

Figure 11: Scatterplot (with fitted quadratic equation) of age versus number of phase II case starts in 2012

ii) ANALYZING SEX, CHILDREN LIVING AND HOME AND AGE

As the total number of children an orthodontist had did not significantly affect the work patterns of Canadian orthodontists, it was decided to analyze whether having children living at home affects work patterns. The effects of sex were evaluated while statistically controlling for age and whether the orthodontist had children living at home.

Having children living at home does not significantly affect the work patterns of Canadian orthodontists, as it resulted in insignificant findings for all interactions and main effects ($p>0.300$). After removing the covariate of child living at home, the remaining analysis was identical to the previously completed analysis comparing the work patterns of male and female orthodontists while statistically controlling for age (See Table 28).

Table 28: Overall MANCOVA results for effect of sex on work patterns (number of hours/week, number of patients/day and number of phase II case starts/year) with age and having children living at home as covariates

Interaction/Main Effect	p-value	Removed From Analysis
Sex*Age*Child Home	0.720	Yes
Sex*Child Home	0.875	Yes
Sex*Age	0.732	Yes
Age * Child Home	0.303	Yes
Child Home	0.352	Yes

CHAPTER 5: DISCUSSION AND CONCLUSIONS

The purpose of this study was to determine the impact that the increased proportion of female orthodontic specialists will have on the Canadian orthodontic workforce. This study examined the current personal and practice demographics, family structure, work patterns and practice characteristics of Canadian orthodontists. Sex-specific comparisons were conducted to identify trends and factors that could potentially influence practice and work pattern characteristics, in an effort to determine if the increased proportion of female orthodontic specialists within Canada will affect the future delivery of orthodontic care.

RESPONSE RATE

The response rate was 53.9% (57.1% male, 46.2% female), although this was less than the projected response rate, the obtained response rate was respectable, and similar to the average reported response rate of physician's mail surveys[60]. The margin of error of the results was affected by the difference between the anticipated and obtained response rate, this increased the margin of error from 5% to 6%[58].

The regional response rates of male and female orthodontists were reflective of the regional distributions, indicating that the sample is reflective of the orthodontic population in Canada (Tables 1 & 2). For all regions, the proportion of male respondents was higher than female respondents. British Columbia and Quebec had a female response rate that was slightly above the population proportion, however these

differences were minimal. The largest discrepancy was found in the female response rate of the Eastern Region. Following the second mailing there was one female respondent (9%). As women constitute approximately 30% of the orthodontists practicing in the Eastern region, this response rate was not representative. To increase the Eastern female response rate an additional survey was sent to all females practicing in the Eastern region; following the second mailing, the response rate for females in the Eastern region was a closer reflection of the population proportion.

The survey was available to complete either online or mail-based. More mail-based surveys were received; however, this may be due to a number of reasons. First, all of the e-mail addresses to contact each orthodontist were not known, only 326 of the original 378 participant's e-mails were identified. Secondly, the e-mail addresses obtained were mostly for the primary orthodontic practice general information inquiries, and not the personal e-mail addresses for the orthodontist. Third, it is possible that the e-mail address that the information package was sent from, the graduate student's personal academic e-mail address, was not recognized by the server and may have been identified as spam. However, as there is a discrepancy in the number of surveys completed online and via mail-based survey, and the option was available to each participant to complete either version, this may indicate a preference to complete mail-based surveys for a small majority of orthodontists in Canada. Nevertheless, as over 40% of respondents completed the survey online, this demonstrates variability in respondent preference, thus it may serve as an indication to provide both mail and

Internet-based options for survey completion in order to increase overall survey response rate.

GENERAL ANALYSIS DISCUSSION

At the time of the survey, men and women were found to complete their orthodontic training at the same age, and male respondents were on average, 6 years older than their female colleagues. This translates to men having an additional 6 years of practice experience.

The majority of respondents completed their dental and orthodontic training in Canada, with no significant difference between the sexes. Additionally, only 9 respondents indicated that they had completed a Canadian Dental Qualifying Program for foreign trained dentists. From these results it is evident that there is not a significant proportion of foreign trained orthodontists in Canada, consequently, it does not seem likely that immigration is shaping the feminization of orthodontics in Canada, as it has been speculated in other health care professions[17].

Although the majority of Canadian orthodontists complete their dental and orthodontic training in Canada, the proportions were not similar. The reasoning for this difference was not examined, however it could be a reflection of the limited number of orthodontic graduate programs in Canada, difference in curriculum, tuition, available stipends or academic offerings.

The majority of respondents were married; both men and women were equally likely to be married. The majority of female respondents spouses were employed full-time and working as dentists, and dental specialists (55%). The majority of male respondent's spouses were employed part-time or not currently employed, working in a non-health occupation or as a houseparent/homemaker. This factor is of importance, as motivation to work is, in part, determined by a financial need to support a family. If the combined income of female orthodontists is greater than male orthodontists, the work patterns of female orthodontists may be markedly different than their male colleagues.

Male and female respondents had a similar number of children (2). Additionally, there were no differences between the sexes for the average age that they had their first and second child(ren). As the average age at completion of orthodontic training was found to be similar to the average age at which they had their first child, this may be an indication that both male and female orthodontists delay having children until their academic programs are at, or near, completion; possibly with men timing their children during their last academic year and women having their first child shortly after the completion of their training (See Table 4). This difference is of academic interest only, and shows no statistically significant difference.

Men and women reported differences in the types of practices in which they worked. There was weak evidence of a statistically significant difference in working

arrangements between men and women, with men more likely to work as a solo practitioner than any other working arrangement (p=0.061). However, men and women demonstrated marked similarities in their ownership status, number and location of offices, as they were most commonly found to own an orthodontic practice, and work in one office located in a metropolitan area.

Many respondents had held a non-ownership position during their orthodontic career, however more women than men held associate positions. The average length of an associateship position, however, did not differ between the sexes. Reasons for choosing an orthodontic associateship were similar between the sexes.

Practice activity in 2012 was found to be similar between men and women. Men and women were found to work a similar number of days per week and hours per week, including hours in direct patient care; completing paperwork at home; and all other office duties. Additionally, women and men were found to take a similar amount of vacation time in 2012.

Both male and female orthodontists were found to employ a similar number of full-and part-time employees. Additionally, men and women were equally likely to employ an orthodontic associate, in which no variation existed between the sexes. When asked whether they had a preference for an associate (male, female or indifferent), the majority of both sexes indicated no preference. However, of those who indicated a

preference, more men indicated a preference for a male associate, and more women indicated a preference for a female associate. The reasoning for associate preference was mostly for compatibility, personal preference, or maintaining a female/male orthodontic practice. However, of those who indicated a male preference, reasons included (but not limited to): reduced family involvement; absence of pregnancy and maternity leave; lack of reliability of women; greater potential for buy-in for male associates; increased work capacity; fewer hormones; and "ability to leave the toilet seat up". It is evident by these remarks that female orthodontists are not viewed as equal to men, by at least some of the orthodontic practitioners in Canada. Unfortunately these beliefs and speculations are not supported or refuted by the current literature. These remarks and beliefs are one of the most compelling arguments for the necessity of this research, as it is important to identify any sex-specific differences between male and female orthodontists in Canada in an attempt to identify work patterns that can be influenced as the number of women specializing within the field increases.

There was a significant difference between the sexes for the number of leaves of absences during a career. Although the average length of a leave of absence was 9.6 weeks for men and 17.4 weeks for women, there was no significant difference in the average length of a leave between the sexes, this is likely due to the large standard error in the number of weeks taken for a leave. The most common reason for women taking a leave of absence was maternity, while for men it was for personal illness. Interestingly,

86% of women reported having at least 1 child, while only 44% reported having taken a leave of absence over a career, this may be indicative of women either having their children before or during their orthodontic training, or taking a shorter amount of time away for work, and viewing it as a "vacation" from work rather than a leave of absence.

The overwhelming majority of both male and female orthodontists reported being either extremely satisfied or satisfied with orthodontics as a profession. No females and only 1 male reported being dissatisfied with their career choice. Additionally, when asked why they chose a career in orthodontics, the majority of both sexes reported it was due to job satisfaction. It should be mentioned that when duplicate responses were analyzed, the majority of variation was found in the order of ranking for the reason for choosing a career in orthodontics; variations aside, job satisfaction was the predominant first choice. The variation in other responses from duplicate surveys is likely due to the fact that after an individuals first and second reason for choosing to specialize, the remaining factors may not have a significant impact on decision making and consequently, the ranking would be subjective and likely to change. This study did not assess reasons for job satisfaction. However, researchers examined job satisfaction among Canadian orthodontists, and found that that the aspects of orthodontics that gave the highest degree of satisfaction were patient relations, patient care, respect, professional relations and staff[61]. Currently, over 90% of orthodontists in Canada are satisfied with their career choice, and over 50% of them chose their career based on job satisfaction.

Anticipating an age of retirement is difficult, and by no means an accurate representation of true age of retirement. However, this survey attempted to assess the anticipated age of retirement for Canadian orthodontists. Although a statistically significant difference was found in the anticipated retirement age for males and females, it is likely not of any clinical significance. The women who participated in this survey were, on average, 6 years younger than their male colleagues, and it was found that the age of the orthodontist was correlated to the anticipated retirement age: younger individuals anticipated retiring at an earlier age than older individuals. However, if women have less of a financial commitment to work than their male colleagues, there is a possibility that there will be a significant difference between the sexes in actual age of retirement as the number of female orthodontists approaching the age of retirement increases.

WORK PATTERNS OF MALE AND FEMALE ORTHODONTISTS IN CANADA

To determine if any significant differences existed in the work patterns for male and female orthodontists, the number of hours per week in direct patient care, number of patients seen per workday, and number of new (phase II) case starts per year were used as the response variables as these are often used as an indicator of productivity of health care professionals[49, 62]. The effects of sex were evaluated while statistically controlling for age and number of children of the orthodontist as covariates. Although responses were known for other work pattern indicators such as number of days worked per week and number of hours worked per day, in order to reduce the number

of variables analyzed, a preliminary analysis was completed to assess the relation of number of hours worked per week, number of days worked per week and number of hours worked per day; all three variables were positively correlated. Consequently, only the total number of hours worked per week was used in the overall data analyses, as it is an accurate reflection of the information collected from all three variables.

Interestingly, it was found that number of children, or whether an orthodontist has children living at home, does not significantly impact the number of patients seen per workday, number of phase II starts per year or the number of hours worked per week for either male or female orthodontists. Consequently, it appears that having children, regardless of whether or not they currently live at home, is not a good indicator for practice activity.

In the evaluation of differences in work patterns of male and female orthodontists, while statistically controlling for age, it was found that a quadratic relationship existed between age and both number of hours worked per week and number of phase II case starts per year. For both variables, the productivity increased with increasing age until approximately age 50, after which, both hours worked per week and phase II case starts per year decreased with increasing age. Although age explains less than 14% of the variance in hours worked per week (R^2= 0.135) and less than 8% of the variance for phase II starts per year (R^2=0.074), these findings are significant; as at least some of the variation in these work patterns can be explained by age. Additionally, as the average

age of male orthodontists is currently 52 years, this may be an indicator that the majority of male orthodontists are at a peak of their career, and it may be anticipated that their current practice productivity may begin to decrease in the near future. Additionally, as the average age of female orthodontists is 46 years, this may act as an indicator that the majority of female orthodontists in Canada are currently in their prime practice years, and their practice productivity may be expected to increase over the next few years, until they reach their peak performance.

When age was statistically controlled, it was found that no significant differences exist between males and females for the number of patients seen per workday or number of phase II case starts per year. However, there was weak evidence of a significant difference between the sexes for the number of hours worked per week, with men working an average of 3 more hours per week than women. Although this finding is statistically significant, it's clinical significance cannot be determined. As there were no significant differences between the sexes for number of case starts per year, number of days worked per week, number of weeks worked per year, and other work pattern and practice productivity variables, it is assumed that the difference in 3 hours worked per week would have minimal clinical significance.

COMPARISON WITH OTHER DATA

There is limited available published information to directly compare the information obtained from this study. The development of this study was guided by a similar

published work by Blasius and Pae[49], which examined the work pattern and practice productivity differences between male and female orthodontists in the United States in 2000. To validate the results of this survey, direct comparisons will be made in reference to Blasius and Pae's results, in addition to other, applicable, available orthodontic and dental literature.

At the time of Blasius and Pae's[49] survey, the estimated number of orthodontists practicing in the United States was 7648 (6786 male, 862 female). A mail-based survey was sent to a random sample of American orthodontists, consisting of 402 males and 396 females. At the time of our survey, the estimated number of Canadian orthodontists was 799 (608 male, 191 female). A mail and internet-based version of our survey was sent to a random sample of Canadian orthodontists, consisting of 280 males and 91 females. Although the proportion of men and women in our survey sample were not equal, as it was in Blasius and Pae's study, our survey sample was calculated to accurately reflect the population proportion of female and male orthodontists, in order prevent a potential overrepresentation of female orthodontists. There is an overrepresentation of female orthodontists in Blasius and Pae's research, as at the time female orthodontists comprised a mere 11% of the population, while they represented nearly half of the survey respondents.

The response rate of Blasius and Pae's survey was 68.8%, with a 70.6% male and 66.9% female response rate. Although our response rate was less, we found similarities in that

the response rate for males was greater than that of females, as our survey had a 57.1% male and 46.2% female response rate.

At the time of our survey, the average age of orthodontists in Canada was 51 years, with men averaging 52 years, women averaging 46 years. The respondents of our survey were an average of 9 years older than Blasius and Pae's[49] respondents, men 7 years older and women 6 years older. However, in both surveys men were found to be significantly older than their female colleagues. These results are supported by the literature, in which female dentists and specialists have been found to be younger and earlier in their careers than their male colleagues[7-10, 46-48, 50-65]. As the number of women entering the dental profession and specialties has increased significantly within the past few decades it is expected that women within the profession would be younger and earlier in their careers than their male colleagues, these differences are expected to decrease as the number of senior male orthodontists retire from practice.

Both our study and Blasius and Pae[49] found that the average age at graduation from dental school was 26 years; this is an indication that orthodontists in Canada and the U.S. are completing their dental training at a similar age. However, Blasius and Pae found that the average age at completion of orthodontic training was 29 years, while the average age in our survey was 31 years. This difference is likely due to differences in the academic programing and requirements in the U.S and Canadian programs. Many of the orthodontic training programs in the U.S are two years in length, with applicants

entering their program directly out of dental school; Canadian programs are three years in length, and the majority of programs recommend at least one-year of work experience prior to being accepted into an orthodontic specialty-training program.

Blasius and Pae[49] found that men were more likely to be married than women, a finding that is unanimously supported by the available dental literature [32, 36,42, 49, 52, 53]. Our study found that men and women were equally likely to be married. This difference may be due to the fact that the female respondents in our sample were older than the female respondents in Blasius and Pae's survey.

Blasius and Pae[49] found that the majority of married women had a spouse that was employed full-time and over 80% of their spouses were professionals, while the majority of male's spouses were not employed, or employed part-time. Our survey found similar results. Although the implications of these differences were not analyzed in either study, it may have significant implications for the provision of orthodontic care in both Canada and the U.S. For any individual, part of the incentive to work revolves around the need to provide for and support a family. If the combined income of female orthodontists is greater than male orthodontists, the work patterns of female orthodontists may be markedly different than their male colleagues. This was highlighted by a survey assessing the work patterns of male and female dentists in South Africa[53], where it was found that over 80% of male dentists were primary breadwinners for their families, as compared to 20% of females. As female dentists had children, their

hours worked per week decreased significantly, from 84% working at least 35 hours per week to 34%. This dramatic change was attributed to the fact that women had increased flexibility with respect to choosing work schedules due to the fact that the majority of them were not the primary breadwinners for their families.

Blasius and Pae[49] found that men were more likely to own all or part of a practice, as 5% of men were found to be in a non-ownership position and 20% of women. Additionally, they found that men worked in more offices than women, with men working in a median of 2 offices, and women 1 office. Our study found no difference between the sexes for ownership position or number of offices worked in, with 8% of men and 12% of women in non-ownership positions and both sexes owning a median of 1 office. The differences in results may be due to the different nature of the orthodontic market between Canada and the U.S., additionally, these differences may be less pronounced if the survey in the U.S. were to be repeated, as in a American biannual practice study, it was found that in 2005, male orthodontists worked in significantly more satellite clinics than women; however, this difference decreased to non-significant levels in subsequent surveys[7-10].

In Blasius and Pae's[49] study, they found that men worked slightly more hours per week (43.1 hours for men, 39.8 hours for women) and more weeks per year than women (48.2 weeks for men, 46.7 weeks for women). Our study found no significant difference in the number of weeks worked per year between the sexes. However, there was weak

evidence to suggest that men worked 3 additional hours per week than their female colleagues. Our results were similar to the findings of Walton *et al*[51], in which they analyzed the number of hours worked per week for dentists in the U.S. They found that females worked 5 fewer hours per week than their male colleagues, when age and children living at home were statistically controlled. Additionally, studies completed by Murphy *et al*[46], and Collins *et al*[47, 48], which examined the work patterns of orthodontists in the U.K. also found similar results. The authors assessed hours worked per week using the unit of a session (one session equaling 3.5-4 hours) and found that men worked 0.6-1.5 more sessions per week than their female colleagues. The clinical significance of the difference in hours worked per week between the sexes was not assessed in any study.

When analyzing patterns in career breaks, Blasius and Pae[49] found that women took more career breaks than their male colleagues, and the total number of weeks of leave of absence was significantly correlated with the number of children. However, the average length of career breaks was not significantly different between men and women. Additionally, they found that the most common reason for women to take a career break was for child bearing and maternity, while for men it was personal illness or "not having a job". In a similar survey of orthodontists in the U.K, Collins *et al*[47] found that women took significantly more, and significantly longer career breaks than their male colleagues, with 7.2% of men and 56.5% of women taking at least one career break, and women taking career breaks that are an average of 4-6 months longer than their male colleagues. The authors also found that the most common reason for

women taking a career break was for maternity leave, while for men it was "other" reasons, such as extended vacation or postgraduate studies. Our survey found similar results to Blasius and Pae, in that women were significantly more likely to take career breaks than men, however the average length of career breaks was not significantly different between the sexes. Additionally, the maternity was found to be the most common reason for women to take a career break, while for men, the most common reason was illness. However, the results of our survey did not find a significant correlation between the length of leaves of absences over a career and the number of children of the orthodontist.

Blasius and Pae[49] found that having children had an opposite effect on the work patterns of men and women. Female orthodontists with children were found to work fewer days per week than childless women (Range: 0.54-0.4 days), and all men (Range: 0.73-0.81 days). Additionally, men with three or more children were found to see more patients per day and start more cases per year than men with fewer than 3 children, and all women (Range: 9.8-19.8 patients per day; 56.5-125.5 case starts per year). Similarly, Walton *et al*[51], found that having young children (under the age of 18) affected the number of hours worked per week differently for men and women; having young children was found to decrease the number of hours worked per week for women, by 7 hours, and increased the number of hours worked for men by one hour. Our study found that having children, whether or not they live at home, did not affect the work patterns of orthodontists in Canada.

In an additional analysis, Blasius and Pae[49] categorized their sample according to age categories: 29-36, 37-44 and 45-64 for both sexes. They found that age did not significantly affect any of the variables analyzed, however, women in all age categories worked fewer days per week (Range: 0.18-0.81) and saw fewer patients per day (Range: 0.73-19.8) than all men. Our survey did not categorize the sample according to age; rather, age was statistically controlled for during MANCOVA analysis. A relationship was found to exist between the age of the orthodontist and the number of hours worked per week and number of phase II case starts per year, regardless of sex; in that the number of hours worked per week and the number of phase II case starts per year increased with increasing age until approximately 50 years of age, in which both hours worked and new case starts began to decrease with increasing age.

Interestingly, when asking respondents their anticipated retirement age, it was found that the average anticipated age for retirement of Canadian orthodontists was 61 years for women, and 64 years for men. Orthodontists in the U.S. anticipated their average age for retirement to be 58 for women, and 60 years for men[49]. As it is difficult to predict a retirement age, these results are not an accurate reflection of actual retirement age, however they find that orthodontists in Canada project to retire later in life than orthodontists in the US. These differences may be a result of the age difference between orthodontists in the U.S and Canada, as Canadian orthodontists were found to be, on average, 9 years older than orthodontists in the U.S. at the time of survey,

although not verified, there was likely a correlation between the age of the orthodontist and anticipated retirement age in Blasius and Pae's study, as was found in our current study. Consequently, at an earlier age orthodontists anticipate retiring earlier in their career. However, in both studies, women anticipated retiring earlier than their male colleagues, as women in both studies were younger than men, they may hope to retire at a younger age than they will in reality. However, if female orthodontists have less of a financial commitment to work than their male colleagues, there is a possibility that there will be a significant difference between the sexes in actual age of retirement as the number of female orthodontists approaching the age of retirement increases.

When American orthodontists were asked whether they had a sex preference for an associate, the majority indicated that they were indifferent to the sex of an associate[49] (84% of men, 67% of women); while of the orthodontists who did have a preference, the majority preferred a female associate, with 65% indicating a female preference, and 35% a male associate preference. Our survey revealed similar results, in that the majority of Canadian orthodontists are indifferent to the sex of an associate (82.8% of men, 83.9% of women), however, of the orthodontists who did have a preference, men and women were preferred similarly, with 9.2% indicating a male preference and 7.8% a female preference.

In an overall comparison of our survey and the survey conducted by Blasius and Pae[49], there exist many similarities. However, significant sex-specific differences in work

patterns have been identified between the two studies. The differences in results between our survey and the survey conducted by Blasius and Pae may be a reflection of the difference in work and practice patterns of orthodontists in Canada versus the United States, however, it could be due to other variables. The average age of respondents in our survey was 51 years, 46 years for women and 52 years for men. The average age of respondents in Blasius and Pae's survey was 42 years, 39 years for women and 45 for men. This difference in age can reflect to a difference in work patterns and work experience. Also, when determining the sample population, our survey identified a difference in the proportion of male and female orthodontists in Canada, with women constituting approximately 24% of the orthodontic population; as a result our aim was to ensure that our target population was an accurate reflection of the true population proportions. However, in the survey conducted by Blasius and Pae, although they identified a difference in the proportion of male and female orthodontists in the U.S., with women constituting approximately 11% of the practicing orthodontists, their sample population was divided equally between men and women, as a result of this discrepancy, the results of Blasius and Pae's survey have an overrepresentation of female orthodontists which could have resulted in an inaccurate representation of women in the American orthodontic workforce. Additionally, the statistical power of Blasius and Pae's results were reduced and should be interpreted with caution, as in data analysis, Blasius and Pae completed a number of redundant analysis of variance (ANOVA) statistical analyses, while, in order to increase the power of our results, the number of statistical analysis were reduced to one multivariate analysis of covariance.

Furthermore, there is a difference of 13 years between the surveys; Blasius and Pae completed their survey in 2000, while our survey was completed in 2013. In that time, the proportion of female orthodontists has increased in both Canada and the U.S.; the working patterns of both men and women may have significantly changed in this period of time. If the survey were to be repeated in the United States, the results would likely be different than those that were found in 2000, and they may more closely reflect the results of our Canadian survey, which demonstrated less variability in the work and practice pattern of male and female orthodontists.

THE EFFECT OF FEMINIZATION ON THE PROFESSION OF ORTHODONTICS

As this survey was developed from a similar study completed in the United States[49], the questions used were not generated based on a specific theory of feminization; rather a theory was applied to the research after the survey was generated. As a result, the application of "The Preference Theory"[21] to the survey's results is limited. Nonetheless, the effect of feminization on the profession of orthodontists will be analyzed using "The Preference Theory", which is based on the premise that women (and men), although united by sex, are heterogeneous in nature, and personal lifestyle choices are influenced by attitudes preferences and values.

The Preference Theory describes three distinct groups of individuals: *Home-Centered, Adaptive and Work-Centered.* The theory, as described by Catherine Hakim, further classifies 20% of women as *Home-Centered*, 60% *Adaptive* and 20% *Work-Centered*, with

10%, 30% and 60% of men categorized into these classifications respectively. As both men and women specializing in orthodontics would not be categorized as "Home-Centered", it would be expected that approximately 75% of women and 33% of men are *Adaptive* and 25% of women and 66% of men classified as *Work-Centered*.

If the population of orthodontists in Canada could be classified according to this theory, it would be expected that the work patterns of females would be more varied and significantly different when compared to their male colleagues.

Although the results of the current survey indicate some sex-specific differences in the work patterns and demographics of male and female orthodontists in Canada, the differences are not suggestive of significant overall work pattern differences between the sexes that would be expected if 66% of men were *Work-Centered* and 75% of women *Adaptive.* Rather the mild differences between the sexes were found in the mean age, spousal employment, practice arrangement, previous work experience as an orthodontic associate and weak evidence to suggest a difference of three hours worked per week. As a result of the limited differences between the work patterns of male and female orthodontists, the application of the Preference Theory directly to the practicing orthodontists in Canada is limited; rather the proportion of *Adaptive* individuals who specialize in orthodontics is relatively similar between the sexes. Consequently, as female orthodontists do not practice substantially different from men, it is not possible to speculate, at this time, that the increasing number of women specializing in orthodontics would provoke change in the profession.

LIMITATIONS OF THIS STUDY

Although an attempt to minimize potential limitations and sources of error was made, as this study was a survey, there exist certain limitations. Since the participation in this survey was voluntary with no compensation and the immediate perceived value to the respondent may be minimal, survey respondent and non-respondent bias exists.

Additionally, the voluntary response rate could not be controlled. The total response rate for the survey was 53%, although this was less than the anticipated response rate of 68%, it is considered a good survey response, which increased the margin of error by only 1%, from 5 to 6%.

Furthermore, as a significant proportion of the data gathered in this survey was practice statistics that were self reported by the respondent, it is assumed that many of the respondents gave their best estimate rather than the true practice statistic (for example, the number of phase II case starts per year, rather than reporting a true practice statistic of 384 case starts in 2012, respondents may report 375 or 400 case starts), as a result there is a potential for inaccurate self-report or poor estimations by respondents.

In order to minimize the number of errors in the questions and ensure that the questions asked were relevant and readable, a focus group was compiled to test both the English and French versions of the survey. Additionally, in order to ensure proper proportional representation of the sexes and regions of Canada, the survey sample was

divided to accurately reflect population and regional proportions. However, there existed discrepancies in the proportion of male and female respondents within the overall sample (57% male and 46% female response rate) and within regions, indicating under or overrepresentation of the sexes and the regional distributions. Most specifically, following the second mailing of the survey there was only one female respondent from the Eastern region, which is not an accurate representation of the 30% female orthodontist population of the region; an attempt was made to increase the number of female respondents in this region by contacting all of the female orthodontists in the Eastern region, however, at the end of the survey collection, there were only two female respondents from the Eastern region.

As the sample population was selected to accurately represent the population proportions of male and female orthodontists, and women comprise less than 25% of the overall practicing orthodontists in Canada, the number of women selected to participate in the survey was relatively small (94) compared to the male population (289). As a result the sample populations were not equal for statistical comparison. In order to reduce the statistical error associated with an unequal sample sizes, the overall MANCOVA analysis was repeated twenty times. For each analysis all female responses were used and a random sample of male responses were compared, using a sample size that was one and a half times the population of female respondents. As the overall trends observed for the repeated analyses were similar to the results of the entire population comparison it was determined that the statistical results were valid. However, in subsequent secondary analyses, the overall, unequal population was

compared, thus, the results must be interpreted with caution.

Lastly, the results of this survey are static, taken at one point in time. Although valid to identify current personal and professional demographics and work and practice patterns of orthodontists in Canada, this data cannot currently be used to identify patterns or trends in the workforce. Future, follow up studies must be completed and compared to today's results in order to identify the trends and determine if there are truly sex-specific differences in work and practice patterns of orthodontists in Canada.

RECOMMENDATIONS FOR FUTURE STUDY

As this study was the first survey analyzing the personal and practice demographics and work and practice characteristics of orthodontists in Canada, it provides a static representation of the current Canadian orthodontic workforce. This study can be used as a baseline for future follow-up studies to use as a template and comparison to identify if any demographic or work pattern trends exist, or if there are true sex-specific differences in work patterns between male and female orthodontists in Canada.

This survey identified notable differences in the spousal employment of male and female orthodontists in Canada, however further data was not collected to further analyze this information. It would be beneficial for future studies to analyze spousal employment and financial necessity for the practicing orthodontist to provide for their family. Areas of analysis could include: overall household income, spousal income, and orthodontists' primary breadwinner status. This information could be used to identify if

female orthodontists have less of a financial responsibility to provide for their family, and consequently have more flexibility in determining work patterns and projected retirement age.

Lastly, this research and other similar studies have analyzed prospective retirement ages of orthodontists, however, the actual age of retirement of orthodontists has not be analyzed or assessed. It would be beneficial for future studies to identify the actual age of retirement for orthodontists in Canada, as this information has not been collected to date. From this information, an average age of retirement could be determined and sex-specific comparisons could be made. This data, used as a baseline could be used to determine trends and parents in the age of retirement, and consequently the career length, of Canadian orthodontists to help project the available manpower of the Canadian orthodontic workforce.

CONCLUSIONS

The personal and practice demographics and work patterns of male and female orthodontists in Canada are fairly similar, however sex-specific differences were found to exist. Female orthodontists in Canada are younger than their male colleagues; this age discrepancy translates to women having fewer years of clinical experience. Female orthodontists were found to anticipate an earlier age of retirement than their male colleagues. Both male and female orthodontists are equally likely to be married, however female orthodontists are more likely to be married to a professional who is

employed full-time. The most common working arrangement for females was working in a group practice, while for males it was found to be in a solo practice arrangement. Additionally, women were found to have previously worked an as orthodontic associate more often than their male colleagues. There was weak evidence to suggest that men work an additional three hours per week than their female colleagues. Lastly, women were found to be more likely to take a leave of absence during their career than men, which is most often for maternity or child rearing.

Apart from sex-specific differences in work and practice characteristics, it was found that the age of the orthodontist affects the number of hours worked per week and number of phase II case starts per year; as the age of the orthodontist increases, it was found that both number of hours worked per week and number of phase II case starts per year increases until approximately 50 years of age, after this time, the numbers decrease with increasing age. The number of children or whether children currently live at home does not appear to affect the work patterns of orthodontists in Canada.

The results of this study do not give any indication of other factors, such as immigration or location of training that may be shaping the feminization of orthodontics in Canada.

As this is the first survey of its kind in Canada, the impact of sex-specific differences in work patterns of orthodontists has not been assessed over time. The results of this research give us an indication of the current demographic and practice patterns of

Canadian orthodontists, which can be used as a reference for future comparisons to determine the work patterns and trends of the orthodontic workforce. At this time, minor sex-specific differences exist in demographics and work patterns, however, it has yet to be determined what the long term impact of these findings are, and if these differences have any clinical significance. As female orthodontists were not found to practice substantially different from males, it is not possible to speculate that the increasing number of women specializing in orthodontics would provoke change in the profession.

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APPENDICES

APPENDIX A: DEFINITION OF TERMS

FEMINIZATION

The movement of women into occupations in which they were previously underrepresented[14].

GENDER

"The socially constructed roles, behavior, activities and attributes that a particular society considers appropriate for men and women"[63] .

SEX

"Either of the two major forms of individuals that occur in many species and that are distinguished respectively as female or male, especially on the basis of their reproductive organs and [physical characteristics]"[64].

APPENDIX B: SYSTEMATIC SEARCH OF THE LITERATURE

A systematic computerized search of electronic databases was conducted using MEDLINE (OvidSP), PubMed, EMBASE (OvidSP), Scopus (Elsevier), Web of Science (Thompson Reuters), CINAHL (EBSCO) and Cochrane Database of Systematic Reviews (Wiley) from their inception to July 2013.

The terms used for this literature search were 'practice pattern', 'work pattern' 'gender', 'sex', 'sex difference' 'dentist', 'orthodontist''. Specific search dates and strategies are outlined in Appendix C. No limits were applied to any of the search strategies.

The reference lists of the retrieved and finally selected articles were also hand searched, in addition to partial grey literature searches through Google Scholar to identify any additional relevant publications that may have been missed by the electronic searches.

The population, intervention, comparison, outcome, study design (PICOS) format was used to define a clinical question with specific inclusion criteria.

> Population: Practicing orthodontists or dentists, including specialists, of any age
> Intervention (Assessment): Work pattern characteristics of women
> Comparison: Work pattern characteristics of men
> Outcome: Analysis of sex-specific differences in work patterns
> Study Design: Cross Sectional Surveys, Cohort Studies, Case-Control Studies
> Exclusions: Cross sectional surveys analyzing only women in dentistry (dental specialties) without a male comparison, cross sectional studies analyzing dental students/residents, cross sectional studies comparing sex-specific differences in variables other than work and practice characteristics (i.e. caries diagnosis and behavior management), cross sectional studies that did not complete a national comparison of sex specific work pattern differences.

Study Selection: In the first step of the review process, the graduate investigator examined the article titles and available abstracts of all electronic search results. Articles that compared work patterns of male and female dentists, including specialists, were considered for phase I inclusion. Full articles were obtained for publications passing the phase I inclusion criteria. In addition, full articles were obtained for papers that did not have available abstracts, or papers in which inadequate information was stated in the abstract. In the second phase of selection, the graduate investigator applied the remaining inclusion/exclusion criteria to all articles obtained in full. Eligibility criteria were also applied to full articles selected from hand searches and partial grey literature searches.

Data Items: The specific variables that were extracted from studies that met the inclusion criteria were: geographic location of analysis, sample size and response rate;

sex-specific differences in: age, marital status, number of children, practice type, ownership status, practice location, number of hours worked per week, hours worked/day, days worked per week, weeks worked per year, patients seen per day (patient flow), case starts per year, career breaks and anticipated age of retirement, and author's results of study, as provided in the report.

Data Synthesis: If the available collected information would have been adequate then a meta-analysis was going to be considered.

Study Selection: A flowchart illustrating the selection of articles in each stage of the systematic review is presented in Appendix D. Searches of electronic databases, grey literature and Google Scholar searches resulted in 336 original articles; based on title and available abstract a total of 32 articles met initial inclusion criteria and were selected for full article review. Two selected articles were not available in English[65, 66]; and attempts to obtain the articles were unsuccessful. Consequently, only 30 articles were retrieved in full for further evaluation (phase II).

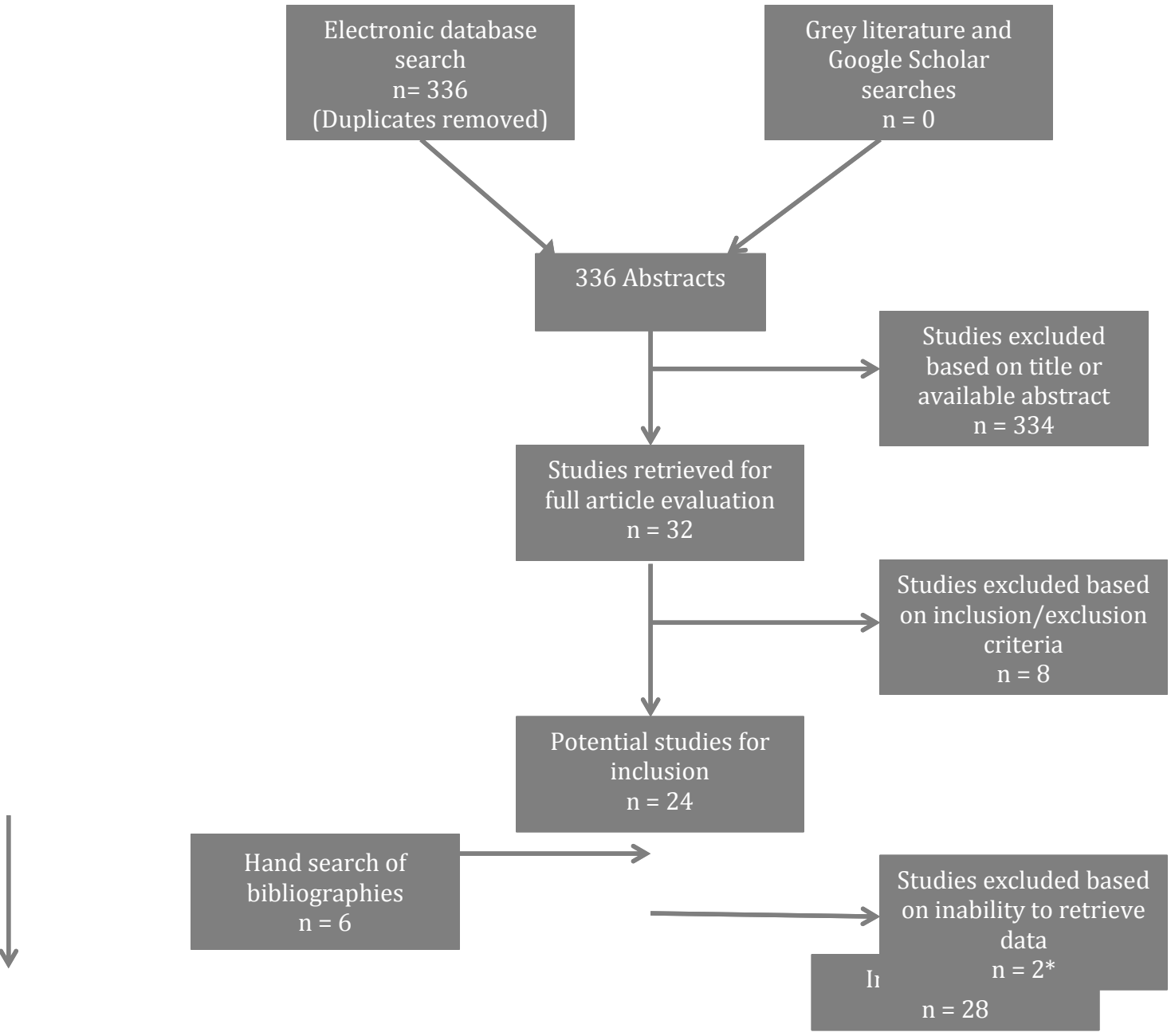
The stated inclusion/exclusion criteria resulted in the rejection of 8 of those articles as the articles either did not compare work pattern differences between men and women[67-70], the study was not a national comparison in work patterns between the sexes[71-73] or the study was a secondary analysis of information previously published[74]. A hand search of the fully selected article bibliographies was completed and an additional 6 articles were identified, giving a total of 28 articles meeting full inclusion criteria.

Significant variability existed between the selected articles with respect to study design, date of study, variables analyzed, participant selection, response rate and statistical analysis performed. The potential risk of bias of the selected studies was high due to poorly structured study design, and neither a meta-analysis nor high quality systematic review could be performed on the studies. Rather, a comprehensive review of the available literature was completed. A summary of the key methodological data and study results for American and International Studies for General Dentists, Dental Specialists (not including orthodontists) and Orthodontists can be viewed in Appendix E.

APPENDIX C: SEARCH STRATEGIES AND RESULTS

MEDLINE (OvidSP) (from 1946 to week 1 July 2013)	(1)exp orthodontics, (2)exp dentistry (3)orthodont*.mp, (4)dentist*.mp, (5)#1 OR #2 OR #3 OR #4 (6)exp dentist's practice patterns, (7)"work pattern*".mp, (8) "practice pattern*".mp, (9)"workforce" OR (10) exp Health Manpower, (11)#6 OR #7 OR #8 OR #9 OR #10 (12)exp sex factors, (13)gender.mp, (14) exp sex, (15) #12 OR #13 OR #14 (16)#5 AND #11 AND #15	175
PubMed (from 1950 to week 1 July 2013)	Same search strategy as MEDLINE (OvidSP)	251
EMBASE (OvidSP) (from 1980 to week 27 2013)	(1)exp orthodontics, (2)exp dentistry (3)orthodont*.mp, (4)dentist*.mp, (5)#1 OR #2 OR #3 OR #4 (6)"practice pattern*.mp", (7)"work pattern*".mp, (8) exp health care manpower, (9) workforce, (10) #6 OR #7 OR #8 OR #9 (11)exp sex difference, (12) "sex factors".mp, (13)gender.mp, (14) exp sex (15) #11 OR #12 OR #13 OR #14 (16)#5 AND #10 AND #15	44
Scopus (Elsevier) (from 1960 to week 1 July 2013)	("orthodontic*" OR "dentist*") AND("gender" OR "sex") AND ("work pattern*" OR "practice pattern*" OR "workforce" OR "manpower")	260
Web of Science (from 1898 to week 1 July 2013)	Same search strategy as Scopus	31
CINAHL (EBSCO) (from 1937 to week 1 July 2013)	Same search strategy as Scopus	39
Cochrane Database of Systematic Reviews (Wiley) (to the second quarter of 2013)	Same search strategy as Scopus	24
Total	N/A	824
Duplicates	N/A	488
Total After Removing Duplicates	N/A	336

APPENDIX D: FLOW CHART OF ARTICLE SELECTION PROCESS



APPENDIX E: KEY METHODOLOGICAL DATA/STUDY RESULTS OF ARTICLES COMPARING WORK PATTERNS OF MALE AND FEMALE DENTISTS/SPECIALISTS

1) Summary of study characteristics of articles comparing work patterns between male and female dentists

Authors	Study Design	Location	Sample Size	Response Rate
Atchison *et al*[54]	SRS Mail Survey to GP's and GP's with PGD graduating in 1989, 1993, or 1997	United States	7387	30% 63.2M, 36.8F
Walton *et al*[32]	Analysis of US Bureau of Labor Statistics data	United States	4563 4209M, 354F	N/A
Wilson *et al*[30]	Analysis of the ADA's Survey of Dental Practice	United States	12025	47.5% 97.5%M, 2.5%F
Newton *et al*[33-35]	SRS Mail Survey of practicing dentists	United Kingdom	2700	66.6% 64.1%M, 32.3%F**
Matthews & Scully[52]	SRS Mail Survey of practicing dentists	United Kingdom	500	78% 48.1%M, 51.9%F
Ayers *at al*[36]	Mail Survey sent to all F and SRS of M licensed dentists	New Zealand	1141	78.1% 55.5%M, 44.5%F
Brennan *et al*[37-40, 50]	SRS Mail Survey of practicing dentists in 1983,1988,1994 1998, 2003, 2009	Australia	1118	76.5% 59.6%M, 40.4%F
Spencer & Lewis[41]	SRS Mail Survey of practicing dentists (1F: 4M)	Australia	994	73.4% 62.3%M, 37.7%F
de Wet *et al*[53]	Mail Survey sent to all F and SRS of M licensed dentists	South Africa	685	245 55.9%M, 44.1%F

SRS = Stratified random sample, GP= General Practitioner, PGD= post-graduate dental training, M=male, F= female, ADA = American Dental Association

**64 declined to identify their sex

2) Comparison of productivity between male and female dentists using hours/week, days/week, patients/day, weeks/year and patient flow

Authors	Hours /week	Hours/day	Days/week	Weeks/year	Patient flow
Atchison *et al*[54]	NR	NR	NR	NR	3367/year M 2937/year F*
Walton *et al*[32]	40.2M 36.2F	NR	NR	NR	NR
Wilson *et al*[30]	<30: 17%M, 24%F >30: 83%M, 76%F	NR	NR	NR	<20/wk: 4%M, 7%F 20-39/wk: 29%M, 37%F 40-59/wk: 54%M, 50%F 60-79/wk: 19%M, 8%F >80/wk: 19%M, 18%F**
Newton *et*	38.04M	NR	NR	47.03M	NR

al[33-35]	30.68F			46.61F	
Matthews & Scully[52]	8.4 CS M childless * 9.1 CS M with children 7.7 CS F childless 6.0 CS F with children	NR	NR	NR	NR
Ayers *at al*[36]	36.0M 29.1F*	NR	NR	NR	NR
Brennan *et al*[37-40, 50]	1806/year M 1395/year F**	NR	NR	NR	1.72/hr M** (3091/year) 1.58/hr W** (2181/year)
Spencer & Lewis[41]	NR	8.1M 7.2F	4.6M 4.1F	48M 45.4F	2.1/hr M 2.4/hr F
de Wet *et al*[53]	NR	NR	NR		NR

M=male, F=Female, NR= Not Reported, CS= clinical session (3.5-4 hours)

*Differences between the two groups significant at p<0.01

** Differences between the two groups significant at p<0.05

3) Comparison of practice characteristics between male and female dentists

Authors	Nu. Practices	Practice Type	Location of practice
Atchison *et al*[54]	NR	Owner: 84.2%M, 69.2%F Non-owner: 10.8%M, 25.5%F Contract: 4.6%M, 5.3%F	NR
Walton *et al*[32]	NR	NR	Metropolitan: 83%M, 91%F
Wilson *et al*[30]	NR	Solo: 57%M, 40%F* Partner: 34%M, 36%F Employed: 9%M, 24%F*	NR
Newton *et al*[33-35]	NR	Solo: 46.3%M, 17.9%F Partner: 29.7%M, 20.1%F Associate: 21.6%M, 54%F Assistant: 2.1%M, 6.1%F Vocational: 0.3%M, 1.9%F	NR
Matthews & Scully[52]	NR	NR	NR
Ayers *at al*[36]	NR	Solo: 70%M, 39%F* Associate: 22%M, 48%F* Hospital: 8%M, 13%F* Teaching: 4%M, 6%F Other: 4%M, 4%F	NR
Brennan *et al*[37-40, 50]	NR	Private: ~90%M, ~80%F* Solo: ~55%M, ~25%F*	NR
Spencer & Lewis[41]	NR	Solo: 40.3%M, 14.2%F Partner: 11%M, 6.8%F Associate: 17.3%M, 6.8%F Assistant: 7.3%M, 28.4%F Public: 24.1%M, 43.8%F	<5000: 4.1%M, 2.5%F 5000-9999: 3.4%M, 5.5%F 10000-99999: 15.2%M, 11%F 100000-49999: 6.7%M, 4.9%F 500000-1 mill: 14.2%M, 13.5%F >1 mill: 56.3%M, 62.6%F
de Wet *et al*[53]	NR	Private: 89.7%M, 70%F Specialist: 8.8%M Government: 10%M, 18.5%F Universities: 3.7%M, 15%F	Urban: 30%M, 25%F Suburb: 35%M, 50%F Town: 20%M, 15%F Rural: 15%M, 10%F**

M=male, F=Female, NR= Not Reported

* Differences between the two groups significant at p<0.05

**The authors did not define what was used to classify size of community

4) Comparison of demographics of male and female dentists

Authors	Avg. Age (years)	Years in Practice	Prospective Retirement	Marital Status	Children
Atchison *et al*[54]	NR	NR	NR	NR	NR
Walton *et al*[32]	45M 38F	NR	NR	84%M married 67%F married	<18 years 50%M 39%F
Wilson *et al*[30]	26-29: 18%M, 25%F 30-34: 56%M, 60%F 35-39: 20%M, 12%F >40:5%M, 3%F	NR	NR	NR	NR
Newton *et al*[33-35]	46.9M 40.32F	22.86M 16.65F	NR	NR	At home: 53.3%M 50.3%F
Matthews & Scully[52]	NR	NR	NR	85%M married 67%F married	NR
Ayers *at al*[36, 75]	20-39: 23%M, 62%M* 40-59: 58%F, 38%M* 60+: 20%M, 0.3%F*	12.5M 8.0F	<50:3%M, 15%F* 50-59:20%M, 48%F* 60+: 67%M, 36%F*	85%M married 75%F married*	0: 16%M, 37%F* 1-2:42%M, 45%F 3+: 43%M, 18%F*
Brennan *et al*[37, 38, 40]	20-39: 29%M, 58%F 40-49: 23%M, 23%F 50+: 48%M, 20%F**	NR	NR	NR	NR
Spencer & Lewis[41]	43.6M 37.2F	19.1M 13.2F	NR	NR	NR
de Wet *et al*[53]	NR	NR	NR	89% M married 85% F married	NR

M=male, F=Female, NR= Not Reported

*Differences between the two groups significant at $p<0.05$

** Used data from most recent 2009 survey

5) Summary of study characteristics of articles comparing work patterns between male and female dental specialists (not including orthodontists)

Authors	Specialty	Study Design	Location	Sample Size	Response Rate
Bogardus *et al* [42]	OMFS	Mail Survey sent to all F and SRS of M registered OMFS	United States	294	48.7% 56.8%M, 43.2%F
Am. Academy of Pediatric Dentistry [44]	PD	Mail Survey to all registered PD	United States	4950	48% 66.2%M, 33.8%F
Arevalo *et al*[43]	PD	Mail and Telephone Survey to all PD	Puerto Rico	75	80% 30%M, 70%F
Hunter *et al*[45]	PD	Mail Survey to all registered PD	United Kingdom	221	86.9% 28.9%M, 71.1%F
Peretz *et al*[31]	PD	Survey of Attendants of Israeli Society of Dentistry for Children**	Israel	112	63% 38.6%M, 61.4%F

SRS = Stratified random sample, OMFS= Oral and Maxillofacial Surgery, PD= Pediatric Dentistry, M=male, F= female, ADA = American Dental Association

**Only 40% of women and 48% were registered dental specialists

6) Comparison of productivity between male and female dental specialists (not including orthodontists) using hours/week, days/week, patients/day, weeks/year and patient flow

Authors	Hours /wk	Hours/day	Days/wk	Weeks/year	Patient flow
Bogardus *et al* [42]	42.3M 55.2F*	NR	5 M 4.5F	47.1M 45.7F	66.6/wk M 55.3/wk F**
Am. Academy of Pediatric Dentistry [44]	NR	NR	NR	NR	NR
Arevalo *et al*[43]	26M 31F	NR	NR	NR	NR
Hunter *et al*[45]	Part-time: 74%M, 47%F Full-time: 26%M, 53%F	NR	NR	NR	NR
Peretz *et al*[31]	0-15: 11%M, 29%F 16+: 89%M, 71%F	NR	NR	NR	NR

M=male, F=Female, NR= Not Reported

*Differences between the two groups significant at p<0.05

***Differences between the two groups significant at p<0.01

7) Comparison of practice characteristics between male and female dental specialists (not including orthodontists)

Authors	Nu. Practices	Practice Type	Location of practice
Bogardus *et al* [42]	1.8M 1.7F	NR	Suburban: 53.6%M, 54.2%F Central City: 31.8%M, 30.1%F Rural: 11.8%M, 16.9%F
Am. Academy of Pediatric Dentistry [44]	NR	Solo: 37%M, 30%F Partner: 8%M, 10%F Shareholder: 29%M, 5%F Employed: 11%M, 24%F Independent: 4%M, 8%F NR: 13%M, 23%F	500,000+: 38%M, 48%F 100,000-500,000: 28%M, 23%F 50,000-99,999: 13%M, 14%F 20,000-49,999: 13%M, 7%F <20,000: 3%M, 2%F NR: 4%M, 6%F
Arevalo *et al*[43]	NR	NR	NR
Hunter *et al*[45]	NR	NR	NR
Peretz *et al*[31]	1: 22%M, 45%F 2+: 78%M, 55%F	NR	NR

M=male, F=Female, NR= Not Reported

8) Comparison of demographics of male and female dental specialists (not including orthodontists)

Authors	Avg. Age (years)	Years in Practice	Prospective Retirement	Marital Status	Children
Bogardus *et al* [42]	48.7M 40.8F	17 M 8 F	NR	84.5%M married 54%F married	2.4M 0.9F
Am. Academy of Pediatric Dentistry [44]	<30: 4M, 20F 30-39: 27%M, 60%F 40-49: 43%M, 12%F 50-59: 17%M, 3%F 60+: 6.9%M, 2.3%F NR: 1.3%M, 2.4%F*	NR	NR	NR	NR
Arevalo *et al*[43]	56M	NR	40 M**	NR	NR

	44F		35 F**		
Hunter *et al*[45]	NR	NR	NR	Nr	NR
Peretz *et al*[31]	43.8M 40.3F	15.6M 14.6F	NR	NR	NR

M=male, F=Female, NR= Not Reported

* Used data from members of AAPD – excluded information from non-members

** Men plan to remain in clinical practice for 40 years total, while women plan to remain in clinical practice for 35 years total

9) Summary of study characteristics of articles comparing work patterns between male and female orthodontists

Authors	Study Design	Location	Sample Size	Response Rate
Blasius & Pae[49]	SRS Mail Survey of practicing orthodontists	United States	798 402M, 396F	68.8% 51.5% M, 48.5%F
Keim *et al*[7]	Mail Survey sent to all practicing orthodontists	United States	9611	6% 85.5%M, 14.5%F
Keim *et al*[8]	Mail Survey sent to all practicing orthodontists	United States	9598	7% 86%M, 14%F
Keim *et al*[9]	Mail Survey sent to all practicing orthodontists	United States	10448	5.2% 88%M, 12%F
Keim *et al*[10]	Mail Survey sent to all practicing orthodontists	United States	10965	3.5% 87%M, 13%F
Collins *et al*[47, 48]	Mail Survey sent to all registered orthodontists	United Kingdom	1088	81.5% 60.2%M, 39.8%F
Murphy[46]	Analysis of the BOS Workforce Survey[76] mailed to all registered orthodontic providers*	United Kingdom	1660	72.7% 68.6%M, 31.4%F

SRS = Stratified random sample, M=male, F= female, BOS= British Orthodontic Society

* Orthodontic providers included orthodontic specialists, and non-specialists completing greater than 30 orthodontic cases in the previous calendar year

10) Comparison of productivity between male and female orthodontists using hours/week, days/week, patients/day, weeks/year and phase II case starts/year

Study	Hours /wk	Days/wk	Patients/day	Weeks/year	Starts/year
Blasius & Pae[49]	NR	4.19-4.38M 3.46-4.01F*	49.92-64.50M 44.67-48.19F*	48.2M 46.7F	206.3-302.0M 176.2-188.9F
Keim *et al*[7]	36.7M 35.2F	NR	52M 44.8F	NR	236.6M 185.7F**
Keim *et al*[8]	37.2M 35.8F	NR	50.8M 46.9F	NR	253.9M 217.9F
Keim *et al*[9]	37.0M 37.7F	NR	50.7M 45.9F	NR	244.6M 233.4F
Keim *et al*[10]	37.1M 34.4F	NR	47.9M 41.9F	NR	239.5M 193.4F
Collins *et al*[47, 48]	8.27 (CS) M 6.99 (CS) F*	NR	NR	NR	NR

Murphy[46]	8.2 (CS) M 7.2 (CS) F	NR	NR	NR	210 M*** 174F ***

M=male, F=Female, NR= Not Reported, CS= clinical session (3.5-4 hours)

* Differences between the two groups significant at p<0.05 when analyzed with other variables) i.e. age/nu. Children)

**Differences between the two groups significant at p<0.01

*** Calculated using number of cases/year/clinical session, as published by author

111) Comparison of practice characteristics between male and female orthodontists

Study	Nu. Practices	Practice Type	Ownership	Nu. Employees
Blasius & Pae[49]	2.4 ± 1.2M 1.7 ± 0.9F*	Solo: 65%M, 50.2%F Group : 27.5%M, 31.3%F	95%M owners 80%F owners *	P/T: 2.6M, 1.89F** F/T: 7.6M, 4.91F*
Keim *et al*[7]	Satellites: 0.6M 0.3F*	NR	NR	P/T: 1.7M, 2.0F F/T: 5.4M, 4.3F
Keim *et al*[8]	Satellites: 0.6M 0.5F	NR	NR	P/T: 1.7M, 1.7F F/T: 6.0M, 5.1F
Keim *et al*[9]	Satellites: 0.6M 0.5F	NR	NR	P/T: 1.6M, 2.1F F/T: 5.6M, 4.9F
Keim *et al*[10]	Satellites: 0.6M 0.3F	NR	NR	P/T: 1.6M, 1.7F F/T: 5.8M, 4.3F
Collins *et al*[47, 48]	NR	NR	NR	NR
Murphy[46]	NR	NR	NR	NR

M=male, F=Female, NR= Not Reported

*Differences between the two groups significant at p<0.01

** Differences between the two groups significant at p<0.05

12) Comparison of demographics of male and female orthodontists

Study	Avg. Age (years)	Nu. Years in Practice	Prospective Retirement Age	Marital Status	Nu. Children
Blasius & Pae[49]	44.9M 39.6F	NR	59.9M 58.2F	65.9%M married 53.5% F married	2.4 ± 1.3M 1.4 ± 1.2 F*
Keim *et al*[7]	NR	21.3M 13.8F*	NR	NR	NR
Keim *et al*[8]	NR	21.1M 13.4F*	NR	NR	NR
Keim *et al*[9]	NR	22.7M 15.8F*	NR	NR	NR
Keim *et al*[10]	NR	23.8M 17.9F*	NR	NR	NR
Collins *et al*[47, 48]	NR	NR	Within 5 years: 16% M 13%F	NR	NR
Murphy[46]	46.4M 42.7F	NR	NR	NR	NR

M=male, F=Female, NR= Not Reported

*Differences between the two groups significant at p<0.01

APPENDIX F: ENGLISH LETTER OF INTRODUCTION/CONSENT FORM

(Printed on University of Alberta Letterhead)

Study Title: Practice and Work-Pattern Differences Between Male and Female Orthodontists in Canada

Principal Investigator: Dr. Stephanie Walker
Graduate Orthodontic Student
Tel: (780)-265-2580
Email: slwalker@ualberta.ca

Background: My name is Dr. Stephanie Walker and I am currently a second year student in the 3-year graduate orthodontics program at the University of Alberta. I am conducting a survey for my Master's Thesis to examine practice and work-pattern differences between male and female orthodontists in Canada. As the number of female orthodontic specialists has increased in recent decades, and is expected to continue to increase, this study will identify future expected practice and work-pattern trends within the orthodontic specialty in Canada. This study has been approved by the University of Alberta's Research Ethics Office.

Procedures: Participating in this study will involve completing the attached questionnaire. If you are receiving this correspondence via e-mail, a mail-based version of this survey will arrive at your primary office address in the near future. Please complete this survey only once, either through the internet-based website, or through mail correspondence The questionnaire involves answering questions on the topics of general practice information, practice activity, current and past work-patterns and general demographic information. The questionnaire is expected to take approximately 10 minutes of your time. Your participation is completely voluntary, and your responses will be completely anonymous. You can discontinue completing the questionnaire at any time. If at any time you do not feel comfortable answering specific survey questions you may leave them blank and complete the remainder of the survey.

Possible Benefits: All participants who participate in the study will be assisting in gathering information about practice pattern trends of Canadian orthodontists, and contributing to determining the potential impact that the increasing number of women specializing in orthodontics may have on the orthodontic profession.

Possible Risks: We do not anticipate any risks associated with the participation of this study.

Confidentiality: All information obtained from the questionnaires will be kept confidential. Only researchers will have access to the study data. Any research data collected during this questionnaire will identify you by a coded number, this coded number will be specific and unique to you, the same coded number will be linked to your mail and internet-based surveys. According to university policy, the principal investigator will store the list cross-referencing the identification number with your name in a secure place for five years. The information acquired from this research may be presented at conferences or published in the future, but participants' names will not be used in written analysis or publications. For surveys completed online data will be housed on servers located in the U.S., and as such is subject to review by the U.S. Federal Authorities as per the U.S. Patriot Act (section 215 Access to Records).

Voluntary Participation: Participation in this questionnaire is completely voluntary; refusal to participate will involve no penalty. You are free to withdraw consent and discontinue participation in this study at any time; you are also free to refuse to answer any question that you may be asked without penalty or prejudice. The completion of this survey implies consent.

Reimbursement of Expenses: There will be no reimbursement for study participation. Following the completion of this study you may request to receive a copy of the study results.

Contact Names and Telephone Numbers: If you have concerns about your rights as a study participant, or how this study is being conducted, you may contact the University of Alberta's Research Ethics Office at (780) 492-2615. This office has no affiliation with the study investigators. If you have any other questions or concerns, please contact: Dr. Stephanie Walker, Masters student and principal investigator: (780) 265-2580, slwalker@ualberta.ca

Please keep this letter for your records. Thank you for your participation.

APPENDIX G: FRENCH LETTER OF INTRODUCTION/CONSENT FORM

(Printed on University of Alberta Letterhead)

Titre de l'étude : Différences dans les schémas de pratique des orthodontistes selon le sexe au Canada

Chercheure principale : Dre Stephanie Walker, directrice,
Graduate Student orthodontique
Téléphone : 780-265-2580
Courriel : slwalker@ualberta.ca

Mise en contexte : Je suis la Dre Stephanie Walker, étudiante de deuxième année au programme d'études supérieures en orthodontie de l'Université de l'Alberta. Ce programme est d'une durée de trois ans. Je mène actuellement une étude dans le cadre de mon mémoire de maîtrise. Cette étude porte sur les différences dans les schémas de pratique des orthodontistes selon le sexe au Canada. Étant donné que le nombre de femmes spécialisées en orthodontie a augmenté au cours des dernières décennies, et que tout porte à croire que leur nombre continuera de croître, je cherche à dégager des tendances en ce qui concerne les schémas de pratique dans le domaine de l'orthodontie au Canada. Cette étude a reçu l'aval du bureau d'éthique de la recherche de l'Université de l'Alberta.

Procédure : Si vous acceptez de participer à cette étude, vous aurez à remplir le questionnaire ci-joint. Si ces documents vous sont parvenus par courriel, vous recevrez prochainement une version papier par la poste, à votre cabinet principal. Veuillez remplir le questionnaire une seule fois, soit par l'intermédiaire du site Web, soit par la poste. Le questionnaire comprend des questions générales sur l'exercice de la profession, sur les activités liées à la profession, sur les schémas de pratique actuels et passés, et sur votre profil démographique. Vous aurez besoin d'environ 10 minutes pour le remplir. Votre participation à cette étude est tout à fait volontaire et vos réponses resteront strictement confidentielles. Vous pouvez arrêter de remplir le questionnaire à tout moment. Si vous ne vous sentez pas à l'aise de répondre à l'une ou l'autre des questions, vous pouvez la passer et remplir le reste du questionnaire.

Avantages possibles : Les participants à cette étude aideront les chercheurs à rassembler de l'information sur les tendances relatives aux schémas de pratique des orthodontistes au Canada. Les renseignements fournis contribueront à déterminer l'incidence que l'augmentation du nombre de femmes orthodontistes pourrait avoir sur la profession.

Risques possibles : La participation à cette étude ne devrait poser aucun risque.

Confidentialité : Tous les renseignements obtenus resteront confidentiels. Seuls les chercheurs auront accès aux données de l'étude. Toutes les données tirées des questionnaires seront codées. Un code unique vous sera attribué. Ce même code sera lié à votre questionnaire papier ou en ligne. Conformément à la politique de l'Université, la chercheuse principale conservera en lieu sûr, pendant cinq ans, la liste des participants et de leur code. Les renseignements recueillis dans le cadre de cette étude pourraient éventuellement être présentés à des conférences ou être publiés, mais le nom des participants ne sera pas dévoilé dans les publications ou les analyses écrites. Pour les questionnaires remplis données en ligne seront hébergés sur des serveurs situés aux Etats-Unis, et à ce titre fait l'objet d'un examen par les autorités fédérales des États-Unis selon le US Patriot Act (article 215 l'accès aux dossiers).

Participation volontaire : La participation à cette étude est tout à fait volontaire. Vous pouvez refuser d'y participer sans être pénalisé(e). Vous pouvez retirer votre consentement et mettre fin à votre participation à tout moment. Vous pouvez également refuser de répondre à l'une ou l'autre des questions sans pénalité ni préjudice. La réalisation de cette enquête implique un consentement.

Remboursement des dépenses : Aucun remboursement ne sera accordé aux participants à l'étude. Lorsque vous aurez rempli le questionnaire, vous pourrez demander à recevoir une copie des résultats.

Personnes-ressources et numéros de téléphone : Si vous avez des préoccupations concernant vos droits à titre de participant(e) à l'étude, ou comment cette étude est en cours, vous pouvez communiquer avec l'Université de l'Alberta Research Bureau de l'éthique au (780) 492-2615. Ce comité n'est pas affilié aux chercheurs. Si vous avez d'autres questions ou préoccupations, veuillez communiquer avec la Dre Stephanie Walker, étudiante à la maîtrise et cochercheuse, au 780-265-2580 ou à slwalker@ualberta.ca.

Veuillez conserver cette lettre dans vos dossiers. Merci de votre participation.

APPENDIX H: ENGLISH E-MAIL FOR WEB-BASED SURVEY

Subject: Canadian Orthodontist Practice-Pattern Survey

Hello Dr. «First_Name» «Last_Name»,

My name is Dr. Stephanie Walker and I am currently a second year student in the 3-year graduate orthodontics program at the University of Alberta. I am conducting a survey for my Master's Thesis to examine practice and work-pattern differences between male and female orthodontists in Canada. As the number of female orthodontic specialists has increased in recent decades, and is expected to continue to increase, I aim to identify future expected practice and work-pattern trends within the orthodontic specialty in Canada.

If you are receiving this correspondence via e-mail, a mail-based version of this survey will arrive at your primary office address in the near future. Please complete this survey only once, either through the internet-based website, or through mail correspondence

This survey is available online in both English and French. The survey will take about 10 minutes of your time to complete, and will remain open until <<Date>>. To complete the survey, please click the URL below. If you are unable to click the URL, please copy and paste the link into the address bar of your web browser.

https://sites.google.com/a/ualberta.ca/survey/

You will be asked to enter your personalized identification code:

«Code»

Once you have completed the web-based survey you may disregard completing and submitting the mail-based version of this survey.

If you have any other questions or concerns, please do not hesitate to contact me directly.

Thank you for your time.

Sincerely,

Stephanie Walker
(780) 265-2580
slwalker@ualberta.ca

APPENDIX I: FRENCH E-MAIL FOR WEB-BASED SURVEY

Subject: Différences dans les schémas de pratique des orthodontistes selon le sexe au Canada

Bonjour Dre «First_Name» «Last_Name»,

Je suis la Dre Stephanie Walker, étudiante de deuxième année au programme d'études supérieures en orthodontie de l'Université de l'Alberta. Ce programme est d'une durée de trois ans. Je mène actuellement une étude dans le cadre de mon mémoire de maîtrise. Cette étude porte sur les différences dans les schémas de pratique des orthodontistes selon le sexe au Canada. Étant donné que le nombre de femmes spécialisées en orthodontie a augmenté au cours des dernières décennies, et que tout porte à croire que leur nombre continuera de croître, je cherche à dégager des tendances en ce qui concerne les schémas de pratique dans le domaine de l'orthodontie au Canada. Cette étude a reçu l'aval du bureau d'éthique de la recherche de l'Université de l'Alberta.

Si vous recevez ce courrier par e-mail, une version électronique de la base de cette enquête arrive à votre adresse bureau principal dans un proche avenir. S'il vous plaît remplir ce sondage qu'une seule fois, soit par l'intermédiaire du site Web sur Internet ou par correspondance électronique.

Cette enquête est disponible en ligne en anglais et en français. Le sondage prendra environ 10 minutes de votre temps pour compléter, et restera ouverte jusqu'au 31 mai 2013. Pour remplir le questionnaire, s'il vous plaît cliquer sur l'URL ci-dessous. Si vous ne parvenez pas à cliquer sur l'URL, s'il vous plaît copiez et collez le lien dans la barre d'adresse de votre navigateur.

https://www.surveymonkey.com/s/practicepatternFR

Il vous sera demandé d'entrer votre code d'identification personnalisée:

«Code»

Une fois que vous avez terminé l'enquête en ligne vous pouvez ignorer remplir et de soumettre la version électronique basé sur cette enquête.
Si vous avez des questions ou des préoccupations, n'hésitez pas à me contacter directement.

Merci pour votre temps.

Cordialement,
Stephanie Walker
(780) 265-2580
slwalker@ualberta.ca

APPENDIX J: ENGLISH INFORMATION LETTER FOR WEB-BASED SURVEY

You can complete this survey online

This survey is available online in both English and French. The survey will take about 10 minutes of your time to complete, and will remain open until June 15, 2013. To complete the survey online, please enter the url below into the address bar of your web browser.

https://www.surveymonkey.com/s/practicepattern

You will be asked to enter your personalized identification code:

«Code»

This code can also be found in the top right corner of your survey.

Once you have completed the web-based survey you may disregard completing and submitting the mail-based version of this survey.

If you have any other questions or concerns, please do not hesitate to contact me directly.

Thank you for your time.

Sincerely,

Stephanie Walker
780) 265-2580
slwalker@ualberta.ca

APPENDIX K: FRENCH INFORMATION LETTER FOR WEB-BASED SURVEY

*** Vous pouvez remplir ce questionnaire en ligne***

Cette enquête est disponible en ligne en anglais et en français. Le sondage prendra environ 10 minutes de votre temps pour compléter, et restera ouverte jusqu'au 15 juin 2013. Pour compléter le sondage en ligne, s'il vous plaît entrez l'url ci-dessous dans la barre d'adresse de votre navigateur:

https://www.surveymonkey.com/s/practicepatternFR

Il vous sera demandé d'entrer votre code d'identification personnalisée:

«Code»

Ce code peut également être trouvée dans le coin supérieur droit de votre enquête.

Une fois que vous avez terminé l'enquête en ligne vous pouvez ignorer remplir et de soumettre la version électronique basé sur cette enquête.

Si vous avez des questions ou des préoccupations, n'hésitez pas à me contacter directement.

Merci pour votre temps.

Cordialement,

Stephanie Walker
780) 265-2580
slwalker@ualberta.ca

APPENDIX L: ENGLISH SURVEY

Practice Pattern Questionnaire

Section 1: Practice Information

1.1 Province(s) in which you practice:

☐AB ☐NB ☐NT ☐PE ☐YT
☐BC ☐NL ☐NU ☐QC
☐MB ☐NS ☐ON ☐SK

1.2 In how many offices do you currently work? ☐

1.3 Size of community in which your main office is located:

☐Rural (under 20 000 pop.)
☐Small city (20 000-50 000 pop.)
☐Large city (50 001-500 000 pop.)
☐Metropolitan (Over 500 000 pop.)

1.4 Do you currently practice orthodontics (please check all that apply):

☐ In a group practice limited to orthodontics
☐In a group practice with other specialties
☐ Providing orthodontic services in general dental practices
☐As a solo practitioner
☐As an educator
☐As a researcher
☐Do not currently practice
☐Other (please specify): _____

1.5 Do you currently own an orthodontic practice, or part of an orthodontic practice?

☐ Yes, I own an orthodontic practice
☐ Yes, I own part of an orthodontic practice
☐ Yes, I own an orthodontic practice and part of an orthodontic practice
☐No, I do not own an orthodontic practice or part of an orthodontic practice

1.6 Are you currently working in the field of orthodontics either on salary, commission, percentage or associate basis? ☐ Yes ☐ No

1.6a. If yes, how many additional years do you plan on working as an associate or employee? ☐ years

1.6b If yes, are you currently working as an associate while the office that you own is not at full capacity? ☐ Yes ☐ No

1.7	Have you ever worked as an orthodontic associate?	☐ Yes	☐ No
1.7a	If yes, how many years did you work as an associate?		years

1.7b Why did you choose this type of working arrangement? (Please answer this question if you are currently working as an associate or if you have previously worked as an associate)

- ☐ Allows increased time/flexibility to allocate time for other priorities
- ☐ Prefer not to make a geographic commitment
- ☐ Not interested in practice ownership
- ☐ Unprepared to make financial commitment to ownership
- ☐ Other (please describe) _____

Section 2: Practice Activity

2.1	On average how many hours per week do you spend:	
	In direct patient care?	hours
	Performing all other tasks in the office?	hours
	Doing paperwork at home?	hours
2.2	In a typical workday how many hours do you work? (All practice requirements)	hours
2.3	How many days do you typically work per week?	days
2.4	Average number of patients seen per day	patients
2.5	Total number of phase II case starts in 2012 (please indicate <u>your</u> contribution only)	cases
2.6a	If you work in a group practice, do you share patients?	☐ Yes ☐ No
2.6b	If yes, what were your combined number of phase II case starts in 2012?	cases

Section 3: Personal Vacation and Leaves of Absence

3.1	How many weeks of vacation did you take in 2012?	weeks
3.2	Did you take a leave of absence in 2012?	☐ Yes ☐ No
3.3	If yes, for how many weeks?	weeks

3.4	Have you ever taken a leave of absence from orthodontic practice?	☐ Yes	☐ No
3.4a	If yes, how many total leave of absences have you taken in your career?		

3.5	Indicate, to the best of your ability, the total number of weeks you have taken for leave of absences during your career	weeks

3.6 If you have taken a leave of absence, please indicate the reason for your leave (Please check all that apply and indicate the approximate number of weeks missed for each reason)

Reason for Leave	# weeks
☐ Personal illness	
☐ Family illness	
☐ Child rearing	
☐ Maternity	
☐ Financial problems	
☐ Financial security	
☐ Could not find a job	
☐ Family concerns	
☐ Extended vacation (> 4 weeks)	
☐ Other (describe)	

Section 4: Practice Information for <u>Practice Owners</u>
(Please skip to Section 5 if this does not apply)

4.1 Indicate the number of employees in your primary practice, **not including associates**

# Full-time (30+ hrs./wk.)	# Part-time (<30 hrs./wk.)

4.2	Do you have associates working in your practice?	☐ Yes	☐ No

4.2a If so, please indicate the number of associates in your primary practice

# Full-time (30+ hrs./wk.)	# Part-time (<30 hrs./wk.)

4.3a What characteristics do you look for in an associate?

_____
_____
_____

4.3b Would you prefer an associate that is:

☐ Male ☐ Female ☐Indifferent

4.3c. Please state your reason for your selection:

_____

_____

_____

Section 5: Additional Information:

5.1 Are you, in general satisfied with the profession of orthodontics?

☐Extremely satisfied
☐Satisfied
☐Moderately Satisfied
☐Dissatisfied
☐Extremely dissatisfied

5.2 At what age do you plan to retire from orthodontic practice? | |

5.3 Why did you choose the specialty of orthodontics? (Please rank with 1 being the most important reason and 6 being the least important reason among those that apply)

Reason	Rank
Professional Autonomy	
Financial Prospects	
Career Suits Abilities	
Job Satisfaction	
Flexible Working Arrangements	
Other: _____	

Section 6: Demographic Information

6.1 Year of Birth | |

6.2 Gender | ☐ Female | ☐ Male |

6.3 Year of Graduation:

Dental School:	
Canadian Dental Qualifying Program (If Applicable)	
Orthodontic Training	

6.4 Where did you attain your dental degree?

☐ Canada
☐ United States
☐ Other (please specify) _____

6.6 Where did you complete your orthodontic training?

☐ Canada
☐ United States
☐ Other (please specify) _____

6.7 Are you currently:

☐ Single ☐ Married ☐Common-Law ☐ Other _____
☐ Divorced ☐ Separated ☐ Widowed

6.8 Is your spouse/partner currently employed?

☐ Full-time (30+ hours/week)
☐ Part-time (<30 hours/week)
☐ Not currently employed

6.9 Spouse's/Partner's occupation

☐ Student
☐ Dentist
☐ Physician
☐ Houseparent/homemaker
☐ Other health profession
☐ Non-health professional
☐ Non-health other occupation
☐ Other(specify) _____

6.10 How many children do you have? (including step-children) ☐

6.10a What were their years of birth?

Child #	Year of Birth	Child #	Year of Birth	Child #	Year of Birth
1		3		5	
2		4		6	

6.10b Do your children/step-children currently reside with you? ☐ Yes ☐ No

Additional Comments:

_____
_____
_____
_____
_____

Thank you for your time, I look forward to receiving your responses

APPENDIX M: FRENCH SURVEY

Questionnaire sur les schémas de pratique des orthodontistes

Section 1 : Renseignements sur l'exercice de la profession

1.6 Indiquez les provinces et territoires où vous exercez votre profession :

□ Alb. □ N.-B. □ T.N.-O. □ Î.-P.-É. □ Yn
□ C.-B. □ T.-N.-L. □ Nt □ Qc
□ Man. □ N.-É. □ Ont. □ Sask.

1.7 Dans combien de cabinets travaillez-vous actuellement? | |

1.8 Taille de la collectivité dans laquelle se trouve votre cabinet principal :

□ Localité rurale (moins de 20 000 habitants)
□ Petite ville (de 20 001 à 50 000 habitants)
□ Grande ville (de 50 001 à 500 000 habitants)
□ Région métropolitaine (plus de 500 000 habitants)

1.9 Pratiquez-vous <u>actuellement</u> l'orthodontie (cochez toutes les réponses qui s'appliquent) :

□ dans un cabinet de groupe composé seulement d'orthodontistes?
□ dans un cabinet de groupe composé de divers spécialistes?
□ dans des cabinets de dentistes généralistes?
□ en tant que praticien(ne) indépendant(e)?
□ en tant qu'enseignant(e)?
□ en tant que chercheur(euse)?
□ Ne pratique pas actuellement.
□ Autre (précisez) : _____

1.10 Êtes-vous <u>actuellement</u> propriétaire d'un cabinet d'orthodontie ou détenez-vous des parts dans un cabinet d'orthodontie?

□ Oui, je suis propriétaire d'un cabinet d'orthodontie.
□ Oui, je détiens des parts dans un cabinet d'orthodontie.
□ Oui, je suis propriétaire d'un cabinet d'orthodontie et je détiens des parts dans un cabinet d'orthodontie.
□ Non, je ne suis pas propriétaire d'un cabinet d'orthodontie et je ne détiens pas de parts dans un cabinet d'orthodontie.

1.6 Travaillez-vous <u>actuellement</u> dans le domaine de l'orthodontie, que ce soit en échange d'un salaire, d'une commission ou d'un pourcentage des revenus ou en tant qu'associé(e)?

□ Oui	□ Non

1.6a Dans l'affirmative, pendant combien d'années encore comptez-vous travailler en tant qu'employé(e) ou associé(e)?

	années

1.6b Dans l'affirmative, travaillez-vous actuellement en tant qu'associé(e) alors que votre propre cabinet n'est pas à pleine capacité?

□ Oui	□ Non

1.7 Avez-vous déjà travaillé en tant qu'orthodontiste associé(e)?

□ Oui	□ Non

1.7a Dans l'affirmative, pendant combien d'années?

	années

1.7b Pourquoi avez-vous choisi cette forme d'emploi? [Veuillez répondre à cette question si vous travaillez actuellement comme associé(e) ou si vous avez déjà travaillé comme associé(e).]

□ Offre plus de flexibilité et permet d'avoir plus de temps à consacrer à d'autres priorités.
□ Je préfère ne pas me fixer à un endroit en particulier.
□ Je ne suis pas intéressé(e) à devenir propriétaire.
□ Je ne suis pas prêt(e) à m'engager financièrement pour devenir propriétaire.
□ Autre (précisez) : _____

Section 2 : Activités liées à la profession

2.1 En moyenne, combien d'heures par semaine consacrez-vous :

aux soins directs aux patients?	heures
aux tâches administratives?	heures
à la paperasse à la maison?	heures

2.2 Au cours d'une journée normale, combien d'heures travaillez-vous? (Inclure toutes les tâches liées à la pratique.)

	heures

2.3 Combien de jours par semaine travaillez-vous habituellement?

	jours

2.4 Nombre moyen de patients rencontrés dans une journée :

	patients

2.5 Nombre total de nouveaux cas de phase II commences en 2012 (veuillez indiquer uniquement <u>votre</u> contribution) :

	cas

2.6a Si vous faites partie d'un cabinet de groupe, est-que vous vous partagez les patients?

□ Oui	□ Non

2.6b Dans l'affirmative veuillez indiquer le nombre de nouveaux cas de phase II commences pour l'ensemble du cabinet en 2012 : | cas

Section 3 : Vacances et congés

3.1 Combien de semaines de vacances avez-vous prises en 2012? | semaines

3.2 Avez-vous pris un congé en 2012? | □ Oui | □ Non

3.3 Dans l'affirmative, veuillez en préciser le nombre de semaines : | semaines

3.4 Avez-vous déjà pris congé de la pratique orthodontique? | □ Oui | □ Non

3.4a Dans l'affirmative, combien de congés avez-vous pris au total dans votre carrière?

3.5 Indiquez, le plus précisément possible, le nombre total de semaines de congé que vous avez prises au cours de votre carrière : | semaines

3.6 Si vous avez pris un congé, veuillez en indiquer la raison. (Cochez toutes les réponses qui s'appliquent et indiquez le nombre approximatif de semaines d'absence pour chacune des raisons.)

Raison du congé	**N^bre^ de semaines**
□ Problème de santé	
□ Problème de santé d'un membre de la famille	
□ Éducation des enfants	
□ Maternité	
□ Problèmes financiers	
□ Sécurité financière	
□ Incapacité à trouver un emploi	
□ Problèmes familiaux	
□ Vacances prolongées (> 4 semaines)	
□ Autre (précisez) :	

Section 4 : Renseignements sur la pratique des <u>propriétaires</u>
(Si vous n'êtes pas propriétaire, passez à la Section 5.)

4.1 Indiquez le nombre d'employés qui travaillent à votre cabinet principal, **en excluant les associés**.

Nbre d'employés à temps plein (30 heures et plus par semaine)	Nbre d'employés à temps partiel (moins de 30 heures par semaine)

4.2 Est-ce que des associés travaillent avec vous dans votre cabinet? | □ Oui | □ Non |

4.2a Dans l'affirmative, indiquez le nombre d'associés qui travaillent à votre cabinet principal.

Nbre d'associés à temps plein (30 heures et plus par semaine)	Nbre d'associés à temps partiel (moins de 30 heures par semaine)

4.3a Quelles caractéristiques recherchez-vous chez un(e) associé(e)?

_____
_____
_____

4.3b Préféreriez-vous :

□ un associé □ une associée □ Aucune préférence

4.3c Veuillez préciser pourquoi :

_____
_____
_____

Section 5 : Renseignements supplémentaires

5.1 Quel est votre niveau de satisfaction à l'égard de la profession d'orthodontiste?

□ Très satisfait(e)
□ Satisfait(e)
□ Moyennement satisfait(e)
□ Insatisfait(e)
□ Très insatisfait(e)

5.2 À quel âge comptez-vous prendre votre retraite de l'orthodontie? | |

5.3 Pourquoi avez-vous choisi de faire carrière en orthodontie? (Veuillez indiquer vos raisons par ordre d'importance, 1 étant la raison la plus importante, et 6 étant la raison la moins importante.)

Raison	**Importance**
Autonomie professionnelle	

Perspectives financières	
Carrière convenant à mes capacités	
Satisfaction professionnelle	
Formules de travail flexibles	
Autre : _____	

Section 6 : Données démographiques

6.1 Année de naissance : |_____|

6.2 Sexe : □ Femme □ Homme

6.3 Année d'obtention du diplôme ou grade :

École dentaire	
Programme canadien de qualification des dentistes (s'il y a lieu)	
Formation en orthodontie	

6.4 Dans quel pays avez-vous obtenu votre grade en médecine dentaire?

□ Canada
□ États-Unis
□ Autre (précisez) : _____

6.5 Dans quel pays avez-vous suivi votre formation en orthodontie?

□ Canada
□ États-Unis
□ Autre (précisez) : _____

6.6 Quel est votre statut matrimonial?

□ Célibataire □ Marié(e) □ Conjoint(e) de fait
□ Divorcé(e) □ Séparé(e) □ Veuf(veuve) □ Autre _____

6.7 Quel est le statut d'emploi de votre conjoint(e) ou conjoint(e) de fait, le cas échéant :

□ Emploi à temps plein (30 heures et plus par semaine)
□ Emploi à temps partiel (moins de 30 heures par semaine)
□ Ne travaille pas pour le moment.

6.8 Profession de votre conjoint(e) ou conjoint(e) de fait :

□ Étudiant(e)
□ Dentiste
□ Médecin
□ Parent à la maison ou personne au foyer
□ Autre professionnel(le) de la santé
□ Professionnel(le) d'un autre domaine que la santé
□ Autre occupation non liée à la santé
□ Autre (précisez) : _____

6.9 Combien d'enfants avez-vous [incluant ceux de votre conjoint(e), le cas échéant]? | |

6.9a Quelle est l'année de naissance de vos enfants?

Enfant n°	**Année de naissance**	**Enfant n°**	**Année de naissance**	**Enfant n°**	**Année de naissance**
1		3		5	
2		4		6	

6.9b Est-ce que vos enfants ou les enfants de votre conjoint(e), le cas échéant, habitent avec vous? | □ Oui | □ Non |

Commentaires :

_____
_____
_____
_____
_____

Merci de votre temps. J'ai hâte de recevoir vos réponses.

APPENDIX N: PROVINCIAL AND REGIONAL DISTRIBUTION OF RESPONDENTS

1) Provincial distributions of male and female respondents

Province		Male	Female	Total
AB	Count	26	5	31
	% Within Province	83.9	16.1	
	% Within Sex	16.2	11.9	
	% of Total	12.9	2.5	15.3
BC	Count	20	7	27
	% Within Province	74.1	25.9	
	% Within Sex	12.5	16.7	
	% of Total	9.9	3.5	13.4
MB	Count	5	1	6
	% Within Province	83.3	16.7	
	% Within Sex	3.1	2.4	
	% of Total	2.5	0.5	3.0
NB	Count	4	1	5
	% Within Province	80.0	20.0	
	% Within Sex	2.5	2.4	
	% of Total	2.0	0.5	2.5
NL	Count	1	0	1
	% Within Province	100.0	0	
	% Within Sex	0.6	0	
	% of Total	0.5	0	0.5
NS	Count	6	1	7
	% Within Province	85.7	14.3	
	% Within Sex	3.8	2.4	
	% of Total	3.0	0.5	3.5
NT	Count	0	0	0
	% Within Province	0	0	
	% Within Sex	0	0	
	% of Total	0	0	0
NU	Count	0	0	0
	% Within Province	0	0	
	% Within Sex	0	0	
	% of Total	0	0	0
ON	Count	72	13	85
	% Within Province	84.7	15.3	
	% Within Sex	45.0	31.0	
	% of Total	35.6	6.4	42.1
PE	Count	1	0	1
	% Within Province	100.0	0	
	% Within Sex	0.6	0	
	% of Total	0.5	0	0.5
QC	Count	25	14	39
	% Within Province	64.1	35.9	
	% Within Sex	15.6	33.3	
	% of Total	12.4	6.9	19.3
SK	Count	5	0	5
	% Within Province	100.0	0	
	% Within Sex	3.1	0	

	% of Total	2.5	0	2.5
YK	Count	0	0	0
	% Within Province	0	0	
	% Within Sex	0	0	
	% of Total	0	0	0
Total	Count	160	42	202
	% of Total	79.2	20.8	100.0

- Three men worked in 2 provinces (MB/ON, ON/QC, AB/BC), one male worked in three provinces (NB/NS/PE)
- 5 respondents did not identify their sex

2) Regional distribution of male and female respondents

Region		**Male**	**Female**	**Total**
AB	Count	26	5	31
	% Within Province	83.9	16.1	
	% Within Sex	16.2	11.9	
	% of Total	12.9	2.5	15.3
BC	Count	20	7	27
	% Within Province	74.1	25.9	
	% Within Sex	12.5	16.7	
	% of Total	9.9	3.5	13.4
MB & SK	Count	10	1	11
	% Within Province	90.9	9.1	
	% Within Sex	6.2	2.4	
	% of Total	5.0	0.5	5.5
Eastern	Count	10	2	12
	% Within Province	83.3	16.7	
	% Within Sex	6.2	4.8	
	% of Total	5.0	1.0	6.0
ON	Count	72	13	85
	% Within Province	84.7	15.3	
	% Within Sex	45.0	31.0	
	% of Total	35.6	6.4	42.1
QC	Count	25	14	39
	% Within Province	64.1	35.9	
	% Within Sex	15.6	33.3	
	% of Total	12.4	6.9	19.3
Total	Count	160	42	202

- Three men worked in 2 provinces (MB/ON, ON/QC, AB/BC), one male worked in three provinces (NB/NS/PE)

5 respondents did not identify their sex