

# Identification of Favourable Prognostic Factors For Non-Operative Management of Full Thickness Rotator Cuff Tears

## 1 Background:

Exploring the potential for formalizing non-operative therapeutic approaches is part of a holistic approach to musculoskeletal care

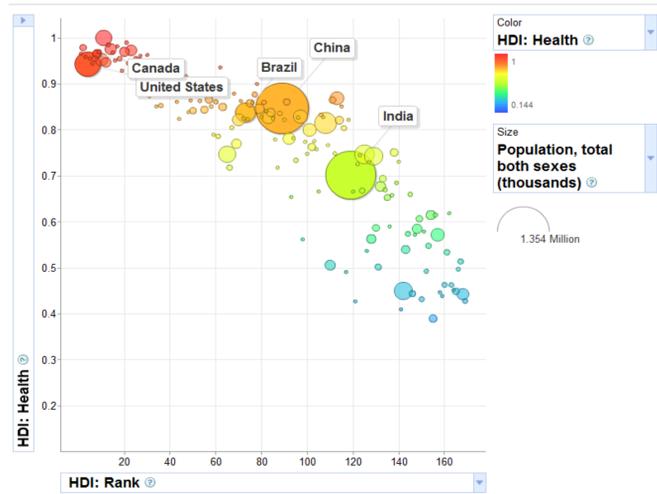
The main indications for surgical intervention to treat full thickness rotator cuff tears are;

- Relief of pain
- Restoration of function

Previous studies investigated the role of conservative measures

This study explores non-operative management as an alternative to surgery

Multiple regression analysis of retrospective data can identify factors affecting the likelihood of success



The relative health markets globally, in terms of the 'Human Development Index' - considering the evolving size of the markets in the developing economies, the effectiveness of strategies developed here have a significant impact globally.

## 4 Discussion:

The non-operative management of small to medium rotator cuff tears offers a viable alternative to the operative path within a selected cohort of subjects

- Important for clinicians and subjects
- Well structured rehabilitation philosophy
- Returning subjects to good functional activity without the need for surgical reconstruction
- Validation will be by applying this model framework to a prospective cohort of subjects

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The work has been funded through;  
• Sport Medicine Clinic (UoC)  
• Alberta Bone and Joint Health Institute (ABJHI)

Level of Evidence  
• This study is rated as a level III therapeutic study  
• Retrospective analysis of a matched cohort  
• O Rt  
• O Rc



### Take Home Messages

- Possible to provide appropriate training programmes customised to the individual
- Integration of the rehabilitation with the conventional orthopaedic management

## 6 Acknowledgements:

This multidisciplinary work is set in the context of established teams collaborating across Alberta

The philosophy is widely established across other centres in the musculoskeletal domain, representing the foundations of the evolving 'Campus Alberta'

## 2 Methods:

### Subject Selection:

159 subjects, 155 shoulders (6 inadequate data and two bilateral cases)

Continuous Variables Considered

Population of subjects were referred to shoulder surgeons for cuff repair;

- University of Calgary (UoC)
- Sport & Exercise Medicine Clinic (SMC)

### They were managed using;

- UoC Non-operative Rotator Cuff Home Rehabilitation Program (illustrated right)

Variable	Range	Mean	SD
Age	33 – 85	58.5	9.8
Full External Range of Motion (ROM)	30 – 180	157	25.9
RCQOL	0 – 100	41.54	
Size of Tear (mm)	5 – 60	18.5	11.3
Duration Symptoms (months)	3 – 180	23.1	29.9

Variable	Value	No.	Value	No.
Onset	Acute	83	Insidious	72
External Rotation Strength	Full	114	Less than full	41
Smoker	Yes	17	No	131
Dominant Side Involved	Yes	109	No	46

## 3 Results:

The non-operative management group had mean outcome scores comparable to the operative management group at 2 years (p=0.05)

Significant reduction in the incidence of pain following rehabilitation compared with the operative group (n=159)

	2LL	Nag R <sup>2</sup>	P	Exp(B)	95%CI lower	95%CI upper
<b>RCQOL + AGE</b>	198	0.14				
RCQOL			0.000	1.031	1.013	1.048
AGE			0.064	1.033	0.998	1.069
<b>RCQOL + Onset</b>	197	0.14				
RCQOL			0.000	1.031	1.014	1.049
Onset			0.055	1.934	0.986	3.794
<b>RCQOL + Full ER St</b>	194	0.17				
RCQOL			0.002	1.028	1.010	1.045
ER strength			0.008	0.341	0.154	0.754
<b>RCQOL + Tear Size</b>	141	0.153				
RCQOL			0.051	1.018	1.000	1.037
Tear Size (mm)			0.007	0.939	0.897	0.983

Variables included were p<0.1 in univariate analyses

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### What is the Rotator Cuff?

The rotator cuff is made up of four muscles (supraspinatus, infraspinatus, subscapularis, teres minor) that help to stabilize the shoulder.

### Stage 1: Weeks 0 - 6

- Goal 1: Decrease your shoulder pain
- Goal 2: Increase your shoulder range of motion (ROM) through stretching and high repetition movement patterns.

STAGE 1 STRETCHES/EXERCISES:  
Stretches should be done multiple times each day. Do each stretch 4 times in a row, holding for 30 seconds each time. Try to do this at least 4 times each day.

#### • 1) Range of Motion Using Pulleys

- o Attach pulleys overhead (directly above your knees). Sit in a chair and hold the ropes in each hand.
- o Pull your good arm downward and allow the injured arm to be lifted upward.
- o Slowly lower your injured arm down, making your good arm do the work.
- o Repeat for up to 5 minutes.

#### • 2) Shoulder Flexion/Elevation (Bent over)

- o Lie on your back clapping your hands together. Slowly raise your arms over your head, using your good arm to do most of the work. Lower and repeat 10 - 15 times.
- o As this becomes easier, allow the injured shoulder to move more and more of the work.
- o To make this even more difficult, prop your upper body up using pillows. The closer your upper body is to vertical, the harder the exercise will be.

#### • 3) Abduction

- o Grasp rubber tubing, and lift your arm straight out to the side. Start by lifting to 20°. Progress to 30°-60°, then 60°-80°.

#### • 4) Subscapularis Hug

- o Start in your available external rotation grasping rubber tubing in your injured arm hand. Pretend you are hugging your arms around a large tree.

#### • 5) Wall Pushups

- o Ensure your shoulder blades are moving towards each other and down your back as you perform your pushup. Place your feet a comfortable distance from the wall, and increase difficulty by moving feet further away. Keep your elbows close to your sides.

#### • 6) 4 Point Plank

- o On your hands and knees, lean slightly forward. Push your arms down into the bed, feeling like you are increasing the distance between the bed and your chest. Hold for 5 seconds.

#### • 7) External Rotation with Towel

- o Bend the elbow of your injured side to 90° and tuck a rolled towel between your elbow and your side. Grasp a piece of rubber tubing that runs in front of your body, then slowly pull by rotating your arm outward. Make sure the towel doesn't slip out!

#### • 8) Forward Flexion

- o Grasp a broom handle in both hands. Slowly use your good arm to raise your injured arm straight out to the side. \*Make sure you don't let your injured shoulder ride upwards.

to push your upper arm down into the bed. Slowly lean your body forwards until you feel a comfortable stretch in your shoulder.

### • 3) Abduction

PROPER TECHNIQUE INCORRECT TECHNIQUE



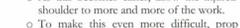
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### • 4) Assisted elevation



o Lie on your back clapping your hands together. Slowly raise your arms over your head, using your good arm to do most of the work. Lower and repeat 10 - 15 times.

### • 5) External Rotation



Bend the elbow of your injured side to 90° and tuck a rolled towel between your elbow and your side. Grasp a broom handle in both hands. Use your good arm

sure that the elbow stays tucked tightly against your side.

### • 6) Internal Rotation



Grasp a towel with your good arm over your shoulder and your injured arm behind your lower back. Slowly pull upwards with your good arm until you feel a comfortable stretch in your injured shoulder.

### • 7) Scapular Retraction



Sit tall. Squeeze your shoulder blades towards each other, hold, then relax.

### Stage 2: Weeks 6 - 12

- Goal 1: Improve the strength and muscular control in your shoulder

- Goal 2: Create muscle fatigue when performing each exercise, without considerable increase in pain. Initially, exercises should be done at least once every day. The resistance, range of motion and pace with which you perform the exercises should be comfortable. If the exercises cause a flare-up in your shoulder pain, you should decrease the activity to the level where there was previously no pain. You can also use ice after the strengthening

Grasp rubber tubing, and lift your arm straight in front of you. Start by lifting to 30°-60°, then progress upwards as comfortable. This exercise is easiest with your palm facing up, and your elbow bent... Straighten elbow or face palm down for increased difficulty.

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## Non-Operative Rotator Cuff Home Program



SPORT MEDICINE CENTRE  
FACULTY OF KINESIOLOGY

This program is intended to be used as a home exercise rehabilitation guide that will help you to achieve a functional shoulder. A physiotherapist can be consulted throughout to teach and individually modify the exercises listed.

## 5 Conclusions:

It was possible to identify risk factors for Non-operative management through multivariate retrospective analysis of outcomes

Evaluation of non-operative treatment of full thickness rotator cuff tears;

- Appropriate way to steer the future management of rotator cuff pathology
- On-going prospective trial now established - results in 2013

Successful results for non-operative intervention can be demonstrated for a selective group of subjects

- High RCQOL score (over 50/100) at presentation
- Rotator cuff tears less than 1cm in size
- Patient over 55 years of age

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grange@ualberta.ca Or visit our website at:  
http://www.sandbox.ualberta.ca/  
where there are links to people, projects and ways that you can join our collaborations and view our publications

