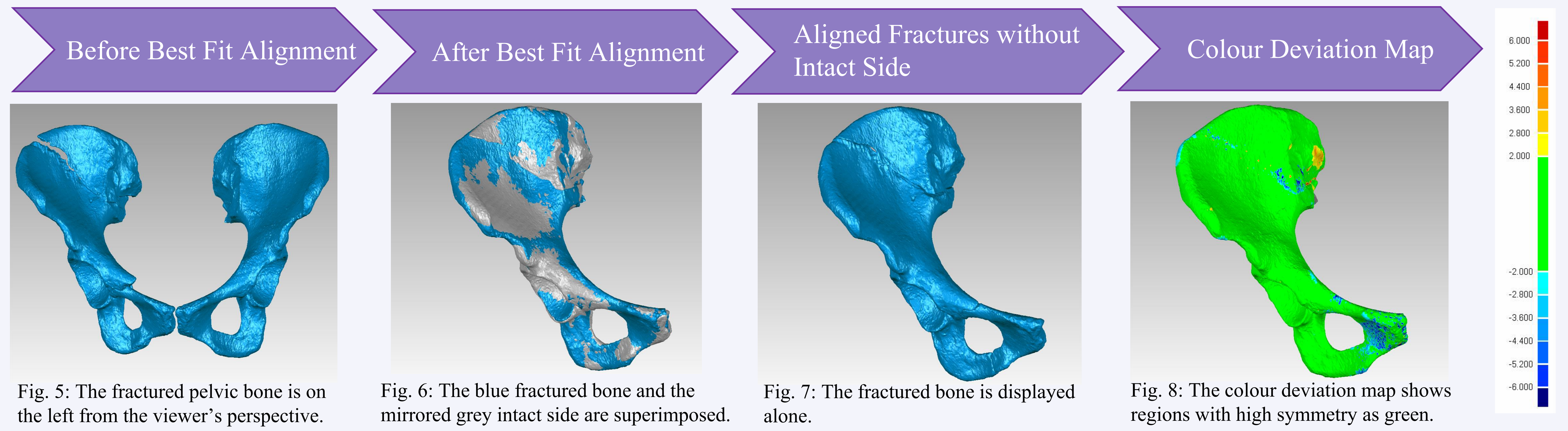


Samantha Polege, Sarah McClelland, Maha Ead, David Li,
Dr. Kajsa Duke, Dr. Lindsey Westover

Department of Mechanical Engineering, University of Alberta

Introduction

- Pelvic bone fractures often result from accidents but surgery to recreate the original shape of the bone in certain areas, such as the acetabulum, is markedly difficult to achieve accurately.
- The pelvis has been proven to possess a reliable level of symmetry, allowing either side to serve as a reference for the other during surgery in cases where one side is fractured and one remains intact.
- The purpose of this study is to utilize the concept of symmetry in reconstructing fractured pelvises.



Methods

- CT data was obtained from the UofA Hospital and anonymized before use.



Fig.1: The fracture on the right inferior pubic ramus is visible in this CT scan.



Fig.2: Right-side fractures on both the iliac wing and the inferior pubic ramus can be viewed.

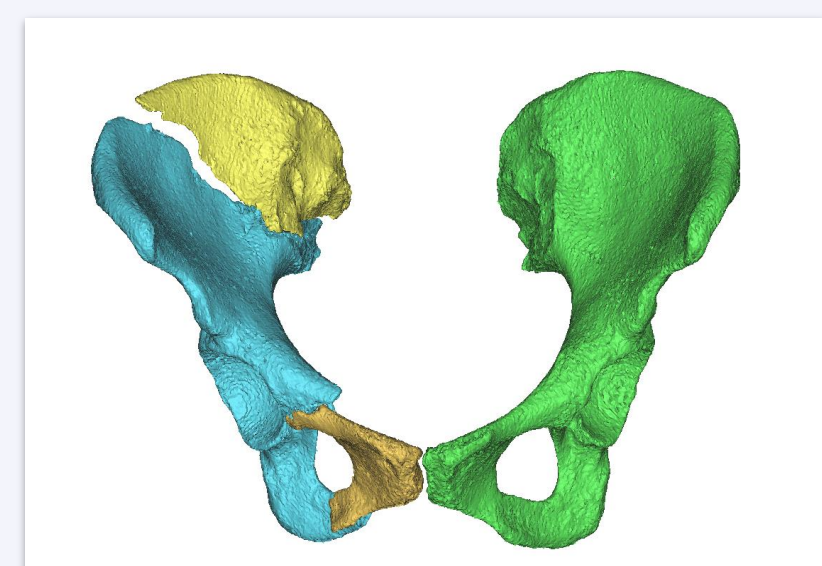


Fig.3: Coloured masks are created for the different fractured segments in MIMICS®.

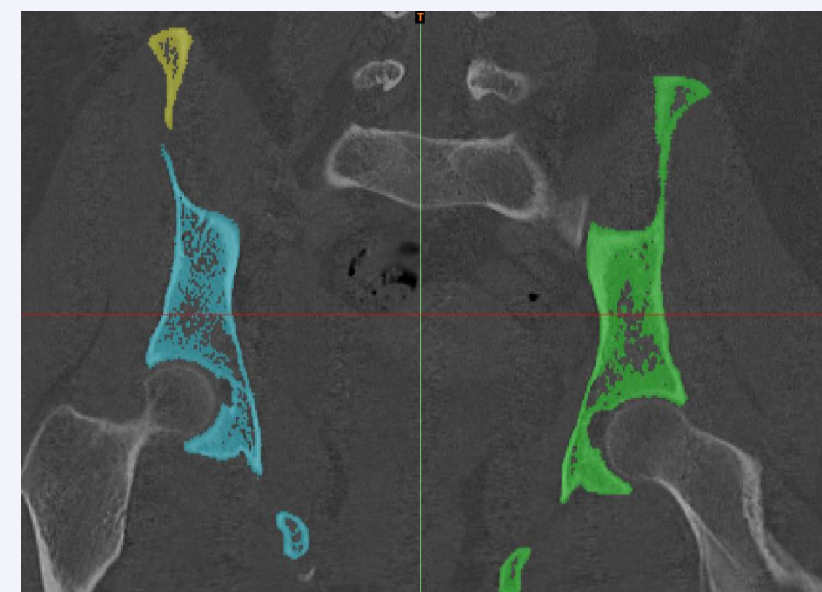


Fig.4: The masks can be seen from different views (front in this example).

- CT scans of pelvic bone fractures were digitized using MIMICS®.
- The digitized models were imported into Geomagic® Control.
- The intact side was mirrored and used to align the fractured pieces of the opposite side.
- Colour deviation graphs and reports were then generated.
- A deviation of less than 2 mm magnitude was considered symmetrical while a deviation greater than 2 mm was judged as not highly similar.

Results

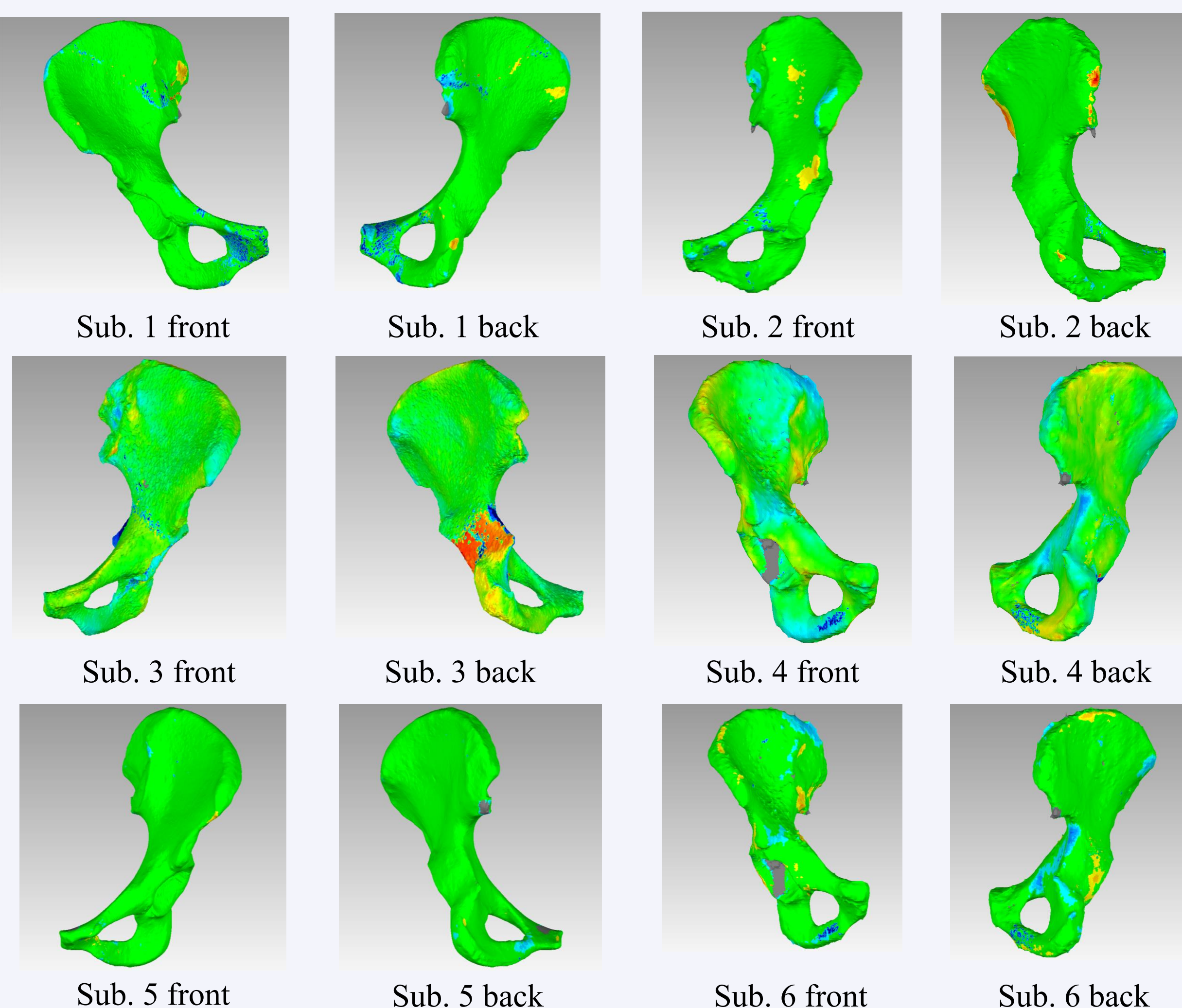


Fig. 9: Anterior and posterior views of the fractured pelvic bone in 6 different subjects in Geomagic®.

Average RMS	1.65 mm	Average % of Points Within ± 2 mm	85.1%
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Conclusions

- The average RMS value for the data was 1.65 mm. This is under 2 mm, the predefined threshold for symmetry used in our study.
- The average percentage of points with less than 2 mm of deviance was 85.1%. Combined with the average RMS value result, this shows that the pelvises studied possess a high degree of symmetry.
- These findings suggest that this method is reliable for virtually reconstructing pelvic fractures for surgical planning.

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