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Do age and gender effect normal-knee joint laxity characteristics in ACL reconstruction patients?

Dr Alexander S Nicholls, FRACS MSc(*Oxon*)
Dr Harbeer Ahedi, PhD

Sydney Orthopaedic Research Institute
Sydney, AUSTRALIA

Faculty Disclosure Information

- My disclosure(s) is/are

- Speaker for Smith & Nephew
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Background

- Collagen integrity and ligament laxity may play a plausible role in patients who sustain the ACL injury.
- Normative values for knee ligament laxity are not well reported.
- GNRB Arthrometer has been routinely used to measure knee joint laxity in patients who sustain ACL rupture.
- GNRB assessment of healthy non-injured knees in patients undergoing ACL reconstruction may provide some insight into the baseline characteristics of knee joint laxity.

Aim

We aimed to define the normative values for healthy knee joint laxity in a paediatric and adult population who underwent ACL reconstruction.

Hypothesis

- **Our primary hypothesis** was that paediatric ACL patients would have more healthy-knee joint laxity than adults.
- **Our secondary hypothesis** was that female patients would demonstrate increased healthy-knee joint laxity compared to male patients.
- **Our tertiary hypothesis** was that gender and body mass index, regardless of age might play a role in higher joint laxity.

Methods

- Post operative GNRB testing is done routinely at our clinic.
- We identified **763 ACLR patients** who underwent GNRB testing from March 2017 to Nov 2023.
- Any patients with ACL revisions, injuries to the healthy leg, or bilateral ACL tears were excluded, **leaving 683 patients** in the study.
- <u>Healthy knee laxity tested at three levels:</u>

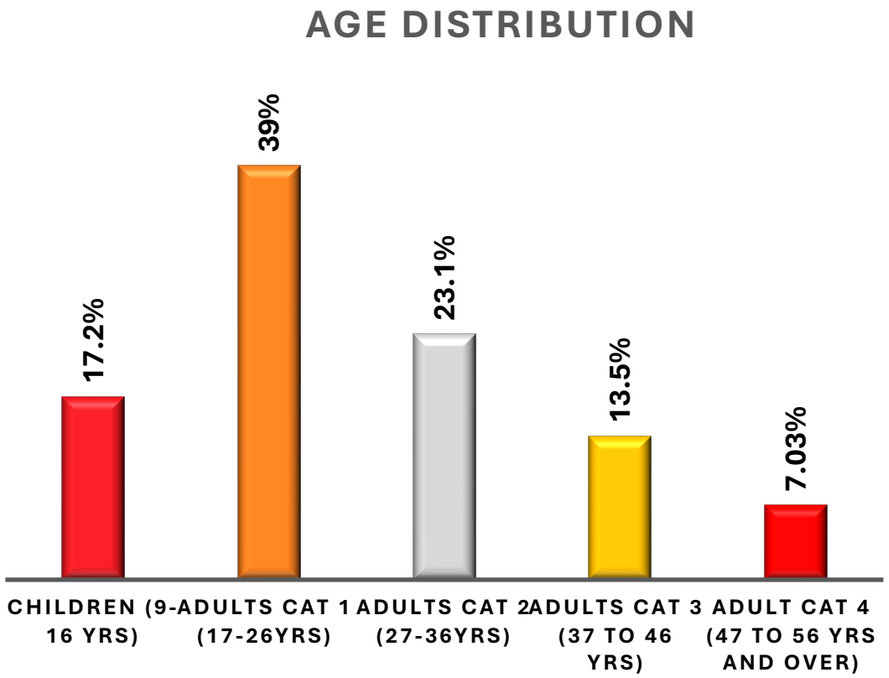
  Mean displacement at 134 Newtons: 5.21 mm (range:0.7 to 14.6)

  Mean displacement at 150 Newtons: 5.86 mm (range: 1.2 to 14.8)

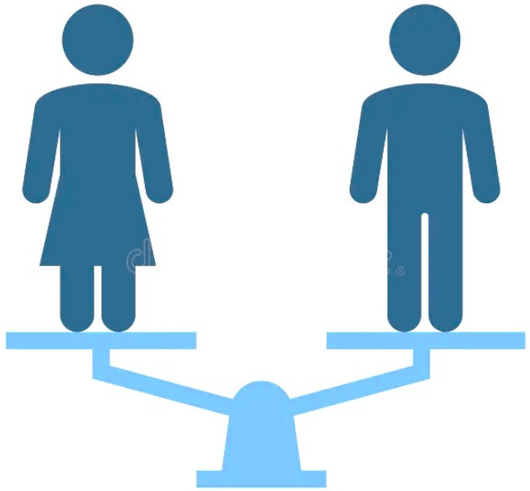
  Mean displacement at 200 Newtons: 7.56 mm (range: 2 to 17.3)

Cohort summary (n=683)

Average age: 26.9 yrs

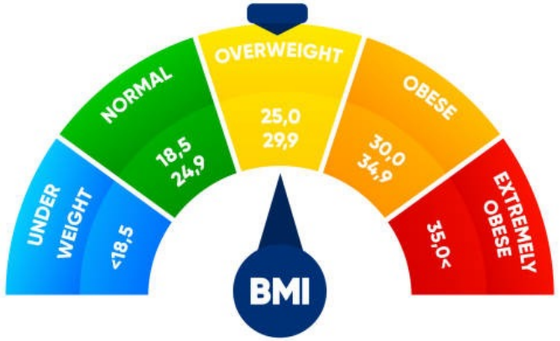


Gender (M/F): 375 (54.9%)/ 308 (45.1%)



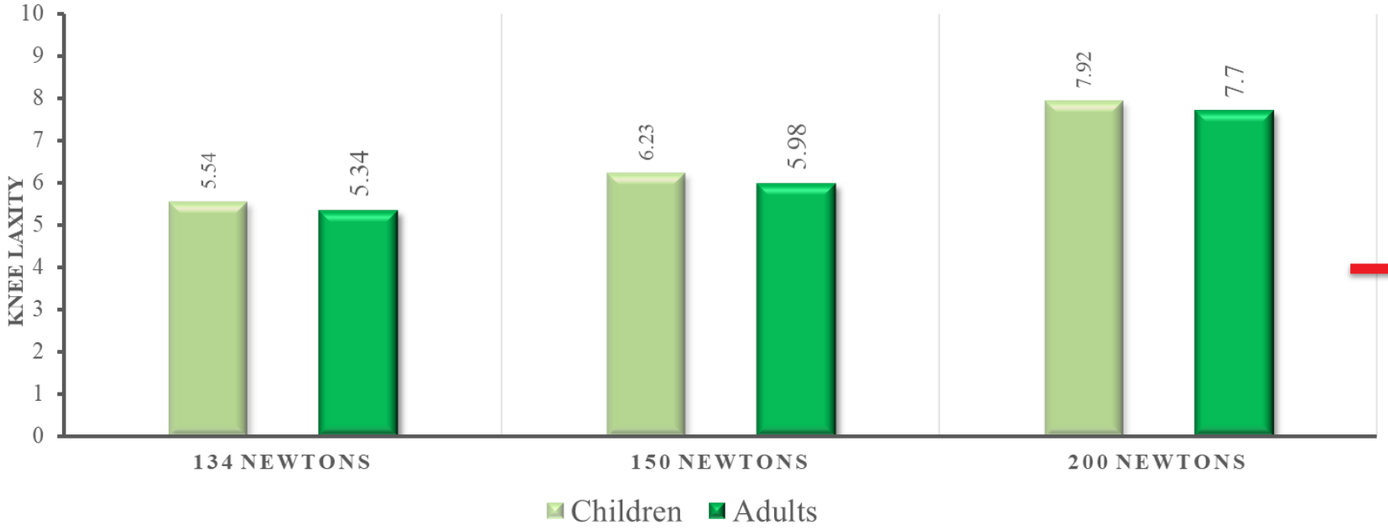
	Female	Male
Children	64	54
Adults	244	321

Average BMI: 26.6



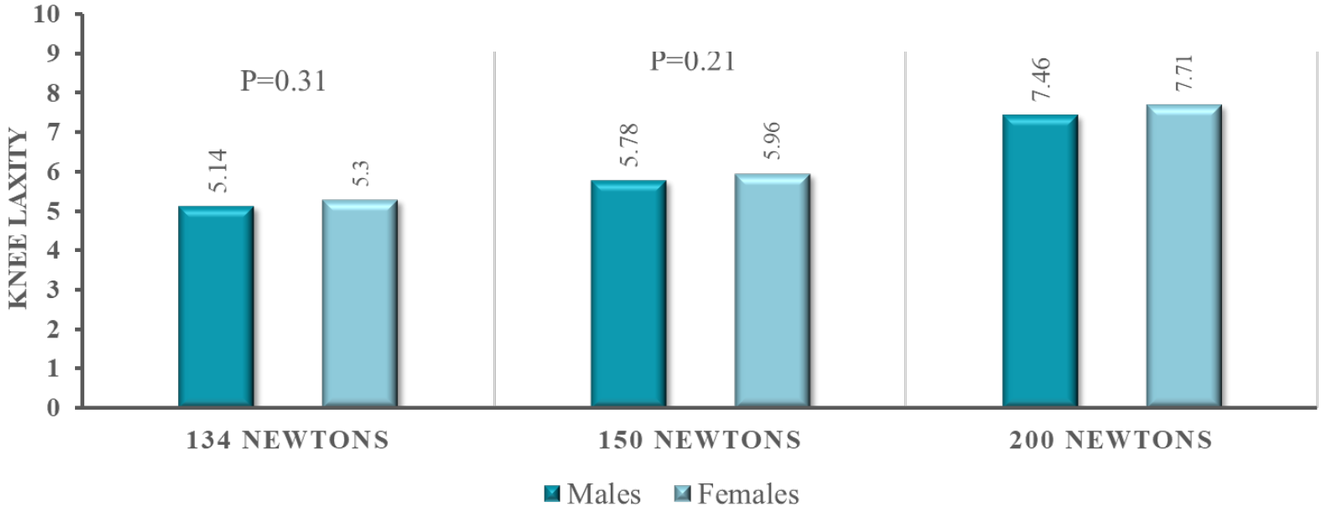
BMI Categories	N (%)
Underweight	4 (0.84%)
Healthy	275 (57.6%)
Overweight	161 (7.76%)
Obese	37 (7.76%)

Differences in healthy knee Laxity



There was no difference in knee laxity between children and adults

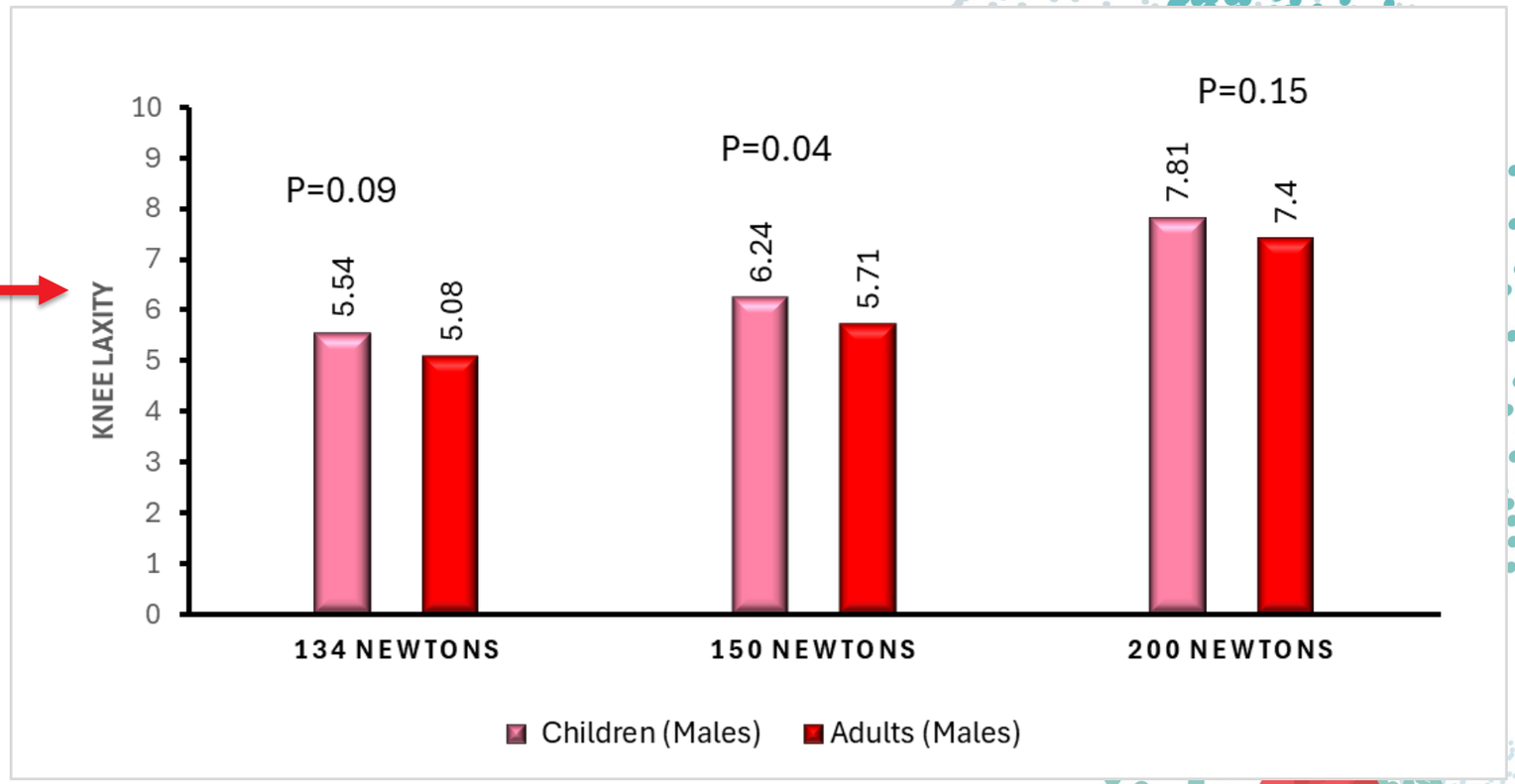
There was no differences in knee laxity between males and females



Differences in healthy knee Laxity by gender and age (Children vs Adults)

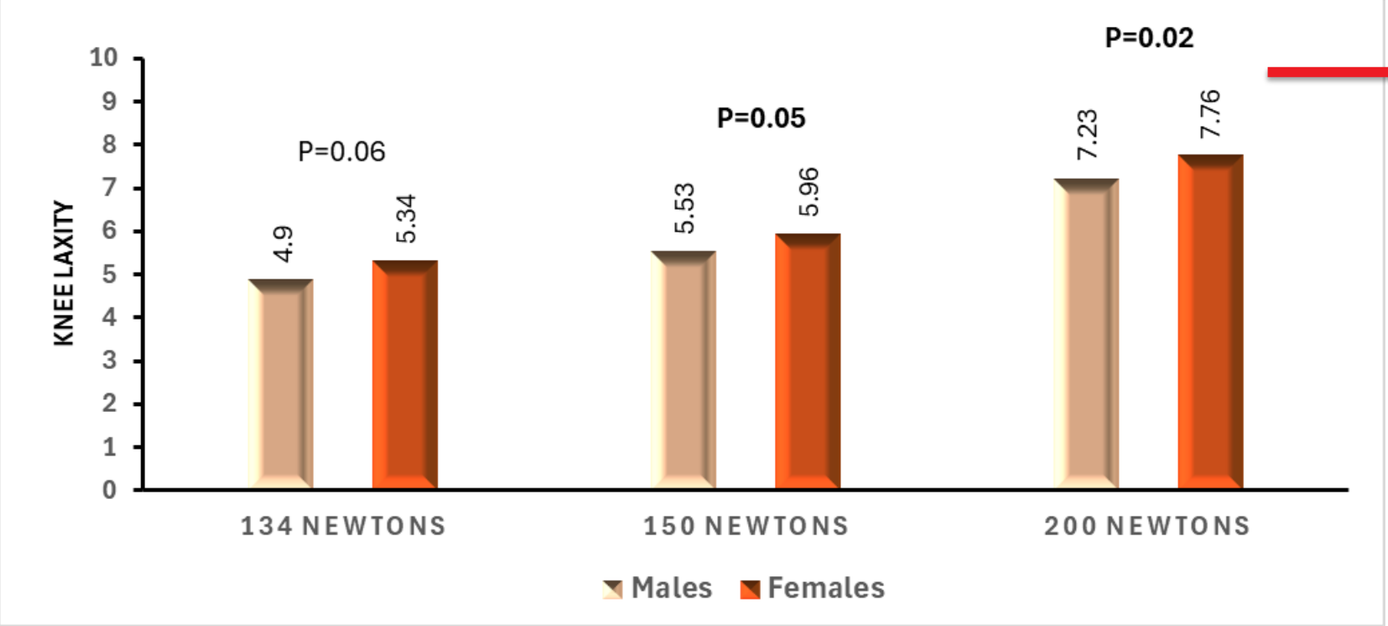
***Male children had significantly higher knee laxity then adult males**

There were no differences in younger or adult females.



Differences in healthy knee Laxity by Age categories

Subanalysis of ages of 17-26 yrs Age Group
(n=113)



***Women between the ages of 17-26 yrs (n=113), had higher knee laxity in comparison to men (n=151) in the same age category.**

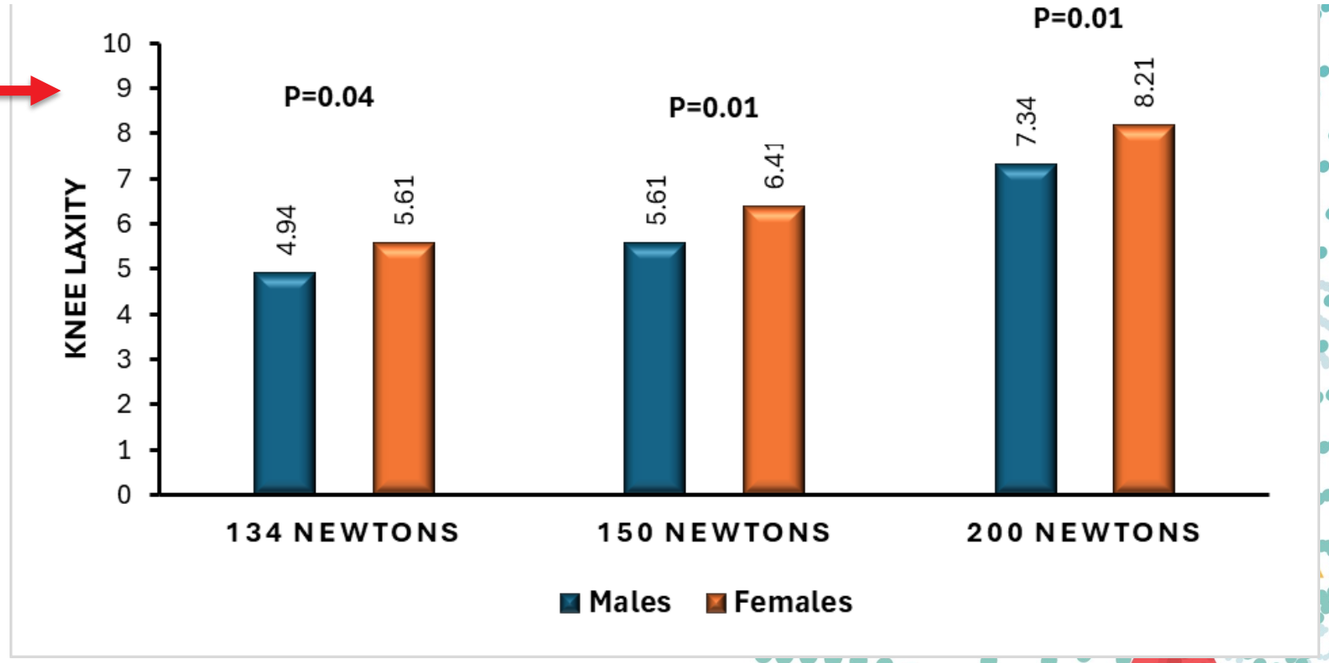
No differences were found in other age categories

Differences in healthy knee Laxity by BMI

***Overweight women (n=57) had higher knee laxity than overweight men (n=104).**

No differences were found in other categories of BMI

Subanalysis of Overweight Males vs Overweight Females (n=171)



Conclusion

- In children, boys had higher laxity in the heathy knee in comparison to girls.
- In overweight patients aged 16-26, women had higher knee laxity than men
- **Healthy knee joint laxity characteristics in an ACL population do not always correlate with gender or age demographics as previously suspected.**

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