Patellar Height Comparison Between Knees In Adolescent and Young Adults

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OBJECTIVES

- A prior study by Berg et al revealed inconsistent side-to-side patellar height ratios between knees in adult patients.[1]
- The majority of these patients were found to have degenerative osteoarthritic changes which could have played a role in the inconsistency of these measurements.
- No study has examined the ability to compare bilateral patellar height ratios in adolescents and young adults without degenerative arthritic changes.
- The Caton-Deschamps Index ratio has previously been validated in the pediatric population and shown to be reliable in measuring patellar height in patients 9 years and older.[2]
- The purpose of this study was to evaluate the reproducibility and accuracy of comparing right to left knee patellar height ratio (Caton-Deschamps Index) in subjects age 13-25 without significant osteoarthritis or extensor mechanism injury.

METHODS

- A retrospective chart review was conducted to identify the first 40 subjects with bilateral knee radiographs obtained from 1/1/15 to 1/1/17 with no prior surgical intervention or diagnosis of injury to the extensor mechanism (acute or chronic).
- Patients between the age of 13-25 at the time of radiographic assessment with bilateral knee sports series radiographs were included in the study.
- Patients with radiographic evidence of osteoarthritic changes (Kellgren Lawrence grade > 0), any prior surgical intervention to either knee, any acute or chronic injury to the extensor mechanism, any acute injury with resulting knee joint effusion, or any evidence of ligamentous instability on clinical exam were excluded from the study.
- Caton-Deschamps Index (CDI) was measured by three different examiners on two separate occasions for each knee in all 40 patients.
- Inter and intra-observer ICC's were calculated, and mean side to side difference was calculated between left and right CDI measurements.
- ICC's ratings were defined by previously set standards as poor (ICC<0.5), moderate (ICC 0.5-0.75), good (ICC 0.75-0.90), and excellent (ICC >0.90).[3]
- Additionally, average left and right means were compared, and 95% CI were calculated.

RESULTS

- The final study consisted of 27 females and 13 males with an average age of 17.7 years of age.
- Intra-observer reliability ICC's were excellent among all examiners (0.92, 0.91, and 0.86), and inter-observer reliability was also excellent at 0.85.
- Mean CDI side to side difference was found to be 0.02 with 95% confidence interval (0.047, -0.002).
- T-test comparing average left and right knee CDI ratios yielded average left knee CDI of 1.10 and right knee CDI of 1.12.
- Ninety percent of the subjects demonstrated an absolute mean side-to-side CDI difference of less than 0.15.

DISCUSSION

- Our study shows that patella height can be measured in children and adolescents without radiographic evidence of osteoarthritic changes.
- There was also minimal variation in patellar height between sides in contrast to the previously performed study in adults.
- Increased patella height (patella alta) has been associated with recurrent patella instability, although, it remains to be seen whether there is an association with MPFL tears.
- There was excellent inter and intra-observer reliability demonstrated for our patient population when measured by the 3 examiners.
- Our average of 1.11 was slightly higher than that presented by Berg et al. of 0.97, which is most likely secondary to our younger patient population that lacked significant osteoarthritic changes.[1]
- These results confirm that in patients age 13-25, patellar height measurements in one knee can reliably estimate the patellar height in the other knee in adolescent and young adult populations.

CONCLUSIONS

- This study shows that in adolescent and young adult patients the CDI can accurately and precisely be calculated by trainees of all levels.
- Additionally, our results show no side-to-side differences in patellar height between knees in our patient population and support the use of the contralateral knee as a control for estimating patellar height in this patient population.

References

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