Introduction

Hip arthroscopy has been increasingly utilized in recent years with expanded indications. During a hip arthroscopy, traction is required to distract the joint in order to safely introduce instrumentation. Maximum traction intensity is the greatest risk factor for postoperative complications such as neurapraxia, skin tearing, and skin necrosis. Previous studies have sought to determine the effects of age, body mass index (BMI), and hip osteoarthritis on traction force during hip arthroscopy. However, these studies have not been expanded to investigate the effects of other features on traction force such as Beighton Hypermobility Score (BHS) and hip dysplasia/acetabular anteversion requiring periacetabular osteotomy (PAO). The purpose of this study was to determine the effects of demographic and anatomic factors on traction force such as Beighton Hypermobility Score (BHS) and need for subsequent periacetabular osteotomy (PAO). All patients underwent postless hip arthroscopy with or without PAO. At the initiation of hip arthroscopy, the traction force required to distract the hip joint was measured prior to capsulotomy using a postless Stryker Guardian Table. Multiple regression analysis was performed to determine the effects of demographic and anatomic factors on distraction force. Demographic and anatomic variables measured included: patient gender, BMI, clinical diagnosis, age, Beighton Hypermobility Score (BHS), hip range of motion (ROM) in clinic and under anesthesia (flexion, internal/external rotation, abduction), lateral center edge angle (LCEA), femoral torsion, equatorial acetabular version (EQ), initial traction force, and traction force following capsulotomy.

Methods

A prospective database was used to collect data on patients undergoing hip arthroscopy by the senior author including patient sex, age, BMI, Beighton Hypermobility Score (BHS), and hip dysplasia/acetabular anteversion requiring periacetabular osteotomy (PAO). All patients underwent postless hip arthroscopy with or without PAO. Previous studies have sought to determine the effects of demographic and anatomic factors on distraction force. Demographic and anatomic variables measured included: patient gender, BMI, clinical diagnosis, age, Beighton Hypermobility Score (BHS), hip range of motion (ROM) in clinic and under anesthesia (flexion, internal/external rotation, abduction), lateral center edge angle (LCEA), femoral torsion, equatorial acetabular version (EQ), initial traction force, and traction force following capsulotomy.

Results

In total, 330 hips (106 male, 224 female) were included with a mean age of 32.9 years and a mean BMI of 24.1 kg/m². Mean initial traction force was 109 pounds which decreased to 94.2 pounds following capsulotomy (p<0.0001). Multilinear regression analysis showed CAM lesions and male sex were positively correlated with initial traction force. External rotation, internal rotation, labral tear, and female sex were negatively correlated with initial traction force. There was no significant correlation for BHS (p=0.06), flexion (p=0.06), femoral torsion, BMI, pincer lesion, lateral center edge angle, sourcil angle, and EQ.

Table 1: patient demographics

<table>
<thead>
<tr>
<th>Patient Demographics</th>
<th>Values (N=330)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y</td>
<td>32.9 ± 11.0</td>
</tr>
<tr>
<td>Sex (male/female)</td>
<td>106/224</td>
</tr>
<tr>
<td>BMI, kg/m²</td>
<td>24.1 ± 4.35</td>
</tr>
<tr>
<td>Beighton Hypermobility Score</td>
<td>2.36 ± 2.25</td>
</tr>
</tbody>
</table>

Figure 1: Correlation between patient variables and starting hip force required

Conclusion

Various demographic and anatomic factors are associated with initial traction force during postless hip arthroscopy. Surgeons can use this information to estimate necessary traction force and also discuss the possibility of traction-related nerve injuries with patients prior to surgery.

References


Acknowledgements

Thank you to my primary project mentor Dr. Mei-Dan and thank you to Dr. Kraeutler and Dr. Lee for the assistance throughout the project.