PATELLAR STABILIZATION PROCEDURES IN THE PEDIATRIC POPULATION: INCIDENCE AND DEMOGRAPHICS

Lauren Agatstein, MA¹, Alton W. Skaggs, BS², Matthew J. Brown, MD³, Nicole Friel, MD MS⁴, Brian Haus, MD⁵

¹Shriners Hospitals for Children Northern California, Sacramento, CA, USA, ²UC Davis School of Medicine, USA, ³Banner Thunderbird Medical Center, Sacramento, CA, USA, ⁴Shriners Hospitals for Children Northern California, Sacramento, CA, USA, ⁵UC Davis, Sacramento, CA, USA

BACKGROUND: Patellar instability is a relatively common condition in the young athletic population. There are multiple surgical options for management of patellar instability including medial patellofemoral ligament reconstruction (MPFL), tibial tubercle osteotomy (TTO), and lateral release, as well as different combinations of these procedures. Prior investigations of the adult population have demonstrated an increase in the amount of surgeries over time. In this study, we investigated the demographics and surgical treatment of patellar instability in pediatric and adolescent patients to determine if 1) there had been more surgeries performed year over year, 2) if there had been a change in the type of surgery performed over time, and 3) if age affected the type of surgery performed.

METHODS: We queried a California statewide ambulatory surgery database (OSHPD) for all patients under 20 years old diagnosed with patellar instability or patella dislocations in the state of California from 2008-2016. Relevant ICD-9 diagnostic codes, ICD-10 diagnostic codes, and CPT procedural codes were used to identify and analyze this data. The incidence, concomitant procedures, demographics, hospital type, and insurance type were obtained to descriptively describe this population.

RESULTS: 4590 patients under the age of 20 received outpatient surgery for patellar instability in 2008-2016. 1472 of the 4590 included concomitant cartilage procedures, while 2733 of the 4590 were patellar stabilization procedures. The average age was 15.5. Of the 4,590 surgeries, 59.6% were female and 40.4% were male. A total of 273 were surgeries were performed on under 13 year-olds, 1808 on 13-15 year-olds, and 2509 on 16-19 year-olds. Included in these 4590 surgeries were 2733 patellar stabilization procedures of interest. Trends were identified concerning the type of patellar stabilization procedures performed. In the youngest population, MPFL alone is performed most frequently (53% of under 13 cases), followed by lateral release alone (34%) and the combination of MPFL and lateral release (13%). For 13-15 year-olds, more lateral release alone procedures (42% of 13-15 cases) were performed. MPFL alone procedures were 40% of cases, with far less MPFL and lateral release combination procedures (13%), TTO and lateral release combination (3%), and TTO alone (2%). For 16-19 year-olds, the frequency of MPFL alone and lateral release alone each accounted for 40% of the patellar stabilization procedures in this age group. 10% of 16-19 cases were then a combination of MPFL and lateral release procedures. TTO alone (4%), TTO and lateral release (4%), and MPFL and TTO (1%) comprised the final 9% of patella stabilization procedures in our oldest patient category.

Procedures performed increased in frequency by age group, as indicated by 5.78% (158 for under 13), 38.6% (1055 for 13-15), and 55.62% (1520 for 16-19) of the total patellar stabilization procedures. The frequency of patellar stabilization procedure categories increased by age group in all categories except for the combination of MPFL and TTO. The same number of MPFL and lateral release procedures were performed, with roughly an equal distribution by age group. Over the nine-year period, trends within the age groups stayed roughly consistent for MPFL and MPFL with lateral release. For the under 13 group, the number also remained consistent for lateral release alone. However, for 13-15 and 16-19, the number of lateral releases performed each year drastically decreased from 2008-2016.

Related to the prevalence of older pediatric patients undergoing this surgery, 81% (3706) received care at an adult hospital while 19% (884) were treated at a children’s hospital. The majority of
California patients receiving surgery were White (53.9%), followed by Hispanic (26.8%), Other (9.1%), Black (5.4%), and Asian (4.8%) race/ethnicity categories. 3472 patients had private insurance, 859 had MediCal, and 259 had another insurance type. The use of private insurance gradually decreased from 2008, while the rate of MediCal coverage greatly increased.

CONCLUSIONS: For the pediatric and adolescent population, the total amount of patellar stabilization procedures performed over time has been stable. However, there has been a decrease in the frequency of lateral releases performed, with an increase in MPFL reconstructions alone over time and with additional procedures. Age was a factor in determining treatment, and as the patients became older, there was a greater percentage of concomitant cartilage procedures.

| Age (years) | Total Patellar Instability Surgeries | Patellar Stabilization Procedures | Cartilage Concomitant Procedures |
|-------------|-------------------------------------|-----------------------------------|---------------------------------|
|             | Total Patellar Stabilization Procedures | MPFL alone | TTO alone | lateral release alone | MPFL + TTO | MPFL + lateral release | TTO + lateral release | micro fracture | chondroplasty | Osteochondral grafting - arthroscopy | Loose cartilage removal |
| Under 13    | 273 | 158 | 83 (.53) | NA | 54 (.34) | NA | 21 (.13) | NA | 20 | 29 | 23 | 20 |
| 13-15       | 1808 | 1055 | 436 (.40) | 22 (.02) | 458 (.42) | NA | 139 (.13) | NA | 36 (.03) | 98 | 191 | 160 | 146 |
| 16-19       | 2509 | 1520 | 629 (.40) | 68 (.04) | 636 (.40) | 31 (.01) | 156 (.10) | NA | 58 (.04) | 117 | 311 | 185 | 172 |
| Total       | 4590 | 2733 | 1146 | 90 | 1148 | 31 | 316 | NA | 94 | 235 | 533 | 368 | 338 |

NA = 0 to 14 patients.

Note: For patellar stabilization procedures, the procedure proportion is in parentheses under the category count. It is the proportion out of total patellar stabilization procedures in that age group.

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