**PASIG MONTHLY CITATION BLAST: No.20** **May 2007**

Dear PASIG members:

CSM abstract application deadlines are rapidly approaching. We hope many of you will consider sharing your PA-related work with our PASIG colleagues by submitting and presenting. Abstract topics can include pilot and full scientific research studies, case studies, clinical topics, or special interest reports. If PASIG members would like feedback on their abstracts prior to submission, please contact me and either I or someone on the PASIG Research Committee will help or recommend you to someone knowledgeable in your area. CSM 2008 will be held on Feb 6 – 10 in Nashville, TN. Abstract submissions will close on June 15, 2007 at 11:59 PM EST. Go to http://www.apta.org/csm for more information and to connect to Scholar One Abstract Central for electronic submission.

Don't forget, the PASIG sponsors an annual student research scholarship. This award is to recognize students, who have had an abstract accepted to CSM, for their contribution to performing arts medicine and research. We encourage you to mentor your students in PA-related research and have them apply! If the PASIG Research Committee can assist students, please contact us. For more information on the research award please check our webpage (www.orthopt.org/sig_pa.php). Students with additional questions can contact PASIG Treasurer Leigh Roberts (lar@brventures.com). And clinicians, if you accept students for a performing arts clinical affiliation, please contact me so that we can update our webpage. The PASIG is an important clearinghouse for this information.

Please step up and serve! The PASIG Nominating Committee requests your nominations for PASIG officers. These include president, treasurer and nominating committee member. You may nominate yourself or another PASIG member. Here's a

chance for you to contribute to the ongoing growth and success of our group by running for office. Nominations are due by 5.31.07. Contact Stephania Bell PT, Nominating Committee Chair at StephaniaB@comcast.net for more information.

Our topic this month is *Osgood-Schlatter Disease*, contributed by myself. The format is an annotated bibliography of articles on the selected topic from 1996 – 2006. Each month's citations will be added to EndNote libraries available on the PASIG webpage for our members to access and download. (Information about EndNote referencing software can be found at http://www.endnote. com, including a 30-day free trial). If you'd like to suggest a topic or create one, please let me know. As always, your comments and entry contributions to these Citation Blasts are always welcome. Please drop me an e-mail anytime.

Regards,
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**Osgood-Schlatter Disease**

In our practice, we have observed the development of tibial apophysitis or '*Osgood Schlatter Disease*' in young adult male dancers (18 – 24), who have completed their growth spurt. Their reparatory usually involves a lot of kneeling, crawling, and backward hinging movements. I began to wonder whether this manifestation in an older population had been reported in the literature. I was not able to find sources that directly answered my question. However, I share with you this month's topic.

Osgood Schlatter Disease (OSD) is a traction disturbance of the patellar tendon's attachment to the tibial tubercle apophysis. The disorder is typified by a painful swelling at the tibial tubercle. Running, jumping, and climbing stairs cause discomfort. Symptoms may occur on one or both legs. The injury occurs most commonly in active adolescents between the age of 11 and 15, when they are going through a growth spurt. Boys are affected three times more frequently than girls. The tibial metaphysis generally starts to fuse to the tuberosity at age 15 in girls and at age 17 in boys, signifying the end of the growth spurt.

Active adolescents that participate in vigorous activities involving the quadriceps are particularly at risk for the development of OSD from the repetitive pull on the open physis. This causes microtrauma with partial avulsion, inflammation, and new bone formation at the tendon insertion on the partially developed tibial tuberosity. This results in traction apophysitis through the ossification center. Eventually, secondary heterotopic

bone formation occurs in the tendon near its insertion, producing a visible lump. OSD is generally a self-limiting condition, that may take months to years to resolve.

Shaw Bronner PT, PHD, OCS


Adirim TA, Cheng TL (2003). Overview of injuries in the young athlete. Sports Med **33**(1): 75-81.

It is estimated that 30 million children in the US participate in organzsed sports programs. As more children participate in sports and recreational activities, there has been an increase in acute and overuse injuries. Emergency department visits are highest among the school-age to young adult population. Over one-third of school-age children will sustain an injury severe enough to be treated by a doctor or nurse. The yearly costs have been estimated to be as high as 1.8 billion US dollars. There are physical and physiological differences between children and adults that may cause children to be more vulnerable to injury. Factors that contribute to this difference in vulnerability include: children have a larger surface area to mass ratio, children have larger heads proportionately, children may be too small for protective equipment, growing cartilage may be more vulnerable to stresses and children may not have the complex motor skills needed for certain sports until after puberty. The most commonly injured areas of the body include the ankle and knee followed by the hand, wrist, elbow, shin and calf, head, neck and clavicle. Contusions and strains are the most common injuries sustained by young athletes. In early adolescence, apophysitis or strains at the apophyses are common. The most common sites are at the knee (Osgood-Schlatter disease), at the heel (Sever's disease) and at the elbow (Little League Elbow). Non-traumatic knee pain is one of the most common complaints in the young athlete. Patellar Femoral Pain Syndrome (PFPS) has a constellation of causes that include overuse, poor tracking of the patellar, malalignment problems of the legs and foot problems, such as pes planus. In the child, hip pathology can present as knee pain so a careful hip exam is important in the child presenting with an insidious onset of knee pain. Other common injuries in young athletes discussed include anterior cruciate ligament injuries, ankle sprains and ankle fractures. Prevention of sports and recreation-related injuries is the ideal. There are six potential ways to prevent injuries in general: (i) the pre-season physical examination; (ii) medical coverage at sporting events; (iii) proper coaching; (iv) adequate hydration; (v) proper officiating; and (vi) proper equipment and field/surface playing conditions.

Bellicini C, Khoury JG (2006). Correction of genu recurvatum secondary to Osgood-Schlatter disease: a case report. Iowa Orthop J **26**: 130-3.

Complications secondary to Osgood-Schlatter disease are rare, and there have been few reports on their treatment. Partial growth arrest of the proximal tibial physis as a result of Osgood-Schlatter disease has been infrequently described. Genu recurvatum from partial physeal arrest can cause cosmetic deformity, instability, pain, and weakness. We report a case of genu recurvatum secondary to Osgood-Schlatter disease treated successfully with proximal tibial osteotomy and distraction with a Taylor spatial frame.

Bloom OJ, Mackler L, et al. (2004). Clinical inquiries. What is the best treatment for Osgood-Schlatter disease? Journal of Family Practice **53**(2): 153-6.

Calmbach WL, Hutchens M (2003). Evaluation of patients presenting with knee pain: Part II. Differential diagnosis. Am Fam Physician **68**(5): 917-22.

Knee pain is a common presenting complaint with many possible causes. An awareness of certain patterns can help the family physician identify the underlying cause more efficiently. Teenage girls and young women are more likely to have patellar tracking problems such as patellar subluxation and patellofemoral pain syndrome, whereas teenage boys and young men are more likely to have knee extensor mechanism problems such as tibial apophysitis (Osgood-Schlatter lesion) and patellar tendonitis. Referred pain resulting from hip joint pathology, such as slipped capital femoral epiphysis, also may cause knee pain. Active patients are more likely to have acute ligamentous sprains and overuse injuries such as pes anserine bursitis and medial plica syndrome. Trauma may result in acute ligamentous rupture or fracture, leading to acute knee joint swelling and hemarthrosis. Septic arthritis may develop in patients of any age, but crystal-induced inflammatory arthropathy is more likely in adults. Osteoarthritis of the knee joint is common in older adults.

Cassas KJ, Cassettari-Wayhs A (2006). Childhood and adolescent sports-related overuse injuries. Am Fam Physician **73**(6): 1014-22.

Youth sports participation carries an inherent risk of injury, including overuse injuries. Little leaguer's shoulder, a stress fracture of the proximal humerus that presents as lateral shoulder pain, usually is self-limited. Little leaguer's elbow is a medial stress injury; treatment consists of complete rest from throwing for four to six weeks followed by rehabilitation and a gradual throwing program. Spondylolysis is a stress fracture of the pars interarticularis. Diagnostic modalities include plain film radiography, bone scan, computed tomography, single photon emission computed tomography, and magnetic resonance imaging. Treatment usually is conservative. Spondylolisthesis is the forward or anterior displacement of one vertebral body over another and may be related to a history of spondylolysis. Diagnosis is made with plain film radiography and graded according to the amount of displacement. Osgood-Schlatter disease presents as anterior knee pain localized to the tibial tubercle. Diagnosis is made clinically, and most patients respond to conservative measures. Calcaneal apophysitis (or Sever's disease) is a common cause of heel pain in young athletes, presenting as pain in the posterior aspect of the calcaneus.

Demirag B, Ozturk C, et al. (2004). The pathophysiology of Osgood-Schlatter disease: a magnetic resonance investigation. J Pediatr Orthop B **13**(6): 379-82.

Osgood-Schlatter disease (OSD) is a well-described clinical condition, although its origin remains controversial. Mechanical, growth or traumatic factors are suggested as causes of this lesion. Thirty-five patients were included in this study. Twenty of them had OSD (study group) and the remaining 15 adolescents constituted the control group. Magnetic resonance imaging of the knees was performed in all patients. The distance between the distal pole of the patella and the proximal margin of patellar tendon attachment to the tibial apophysis (A), the distance between the distal pole of the patella and the tibial tubercle epiphysis (B), the distance between the proximal margin of the patellar tendon attachment to the tibia and the tibial tubercle epiphysis (C) and the distance between the knee joint level and the tibial tubercle epiphysis (D) were measured. The ratio of the distance between the distal pole of the patella and the proximal margin of the patellar tendon attachment to the tibia to the distance between the distal pole of the patella and the tibial tubercle epiphysis (A: B) was lower in the study group. The ratio of the distance between the proximal margin of the patellar tendon attachment point to the tibia and the tibial tubercle epiphysis to the distance between the knee joint level and the tibial

tubercle epiphysis (C: D) was higher in the control group. We conclude that if the patellar tendon attaches more proximally and in a broader area to the tibia, this might probably cause OSD.

Devan MR, Pescatello LS, et al. (2004). A prospective study of overuse knee injuries among female athletes with muscle imbalances and structural abnormalities. J Athl Train **39**(3): 263-267.

OBJECTIVE: To prospectively examine the influence of hamstring-to-quadriceps (H:Q) ratio and structural abnormalities on the prevalence of overuse knee injuries among female collegiate athletes. DESIGN AND SETTING: We used chi-square 2 x 2 contingency tables and the Fischer exact test to examine associations among H:Q ratios, structural abnormalities, and overuse knee injuries. SUBJECTS: Fifty-three apparently healthy women (age = 19.4 +/- 1.3 years, height = 167.6 +/- 10.1 cm, mass = 65.0 +/- 10.0 kg) from National Collegiate Athletic Association Division I women's field hockey (n = 23), soccer (n = 20), and basketball teams (n = 10) volunteered. MEASUREMENTS: The H:Q ratio was determined from a preseason isokinetic test on a Biodex system at 60 degrees /s and 300 degrees /s. We measured athletes for genu recurvatum and Q-angles with a 14-in (35.56-cm) goniometer. Iliotibial band flexibility was assessed via the Ober test. RESULTS: Ten overuse knee injuries (iliotibial band friction syndromes = 5, patellar tendinitis = 3, patellofemoral syndrome = 1, pes anserine tendinitis = 1) occurred in 9 athletes. The H:Q ratio below the normal range at 300 degrees /s (P = 0.047) was associated with overuse knee injuries, as was the presence of genu recurvatum (P = 0.004). In addition, athletes possessing lower H:Q ratios at 300 degrees /s and genu recurvatum incurred more overuse knee injuries than athletes without these abnormalities (P = 0.001). CONCLUSIONS: The presence of genu recurvatum and an H:Q ratio below normal range was associated with an increased prevalence of overuse knee injuries among female collegiate athletes. Further investigation is needed to clarify which preseason screening procedures may identify collegiate athletes who are susceptible to overuse knee injuries.

Dubravcic-Simunjak S, Pecina M, et al. (2003). The incidence of injuries in elite junior figure skaters. Am J Sports Med **31**(4): 511-7.

BACKGROUND: There has been rapid growth in the technical and physiologic demands made on skaters who perform more and more difficult jumps, spins, lifts, throws, and free skating movements. PURPOSE: To investigate the frequency of injuries and overuse syndromes in elite junior skaters. STUDY DESIGN: Questionnaire. METHODS: During four consecutive Junior World Figure Skating Championships and the Croatia Cup, we interviewed 236 female and 233 male skaters by questionnaire to determine the frequency of injuries and overuse syndromes. RESULTS: Fifty-nine of the female skaters (25%) and 65 of the male skaters (27.9%) reported sustaining acute injuries; 101 female (42.8%) and 106 male (45.5%) skaters reported overuse syndromes. Low back pain was reported by 19 female and 23 male skaters. The most frequent acute injury was ankle sprain. In singles female skaters, the most frequent overuse injury was stress fracture (19.8%), followed by jumper's knee (14.9%). In singles male skaters, jumper's knee (16.1%) was the most frequent injury, followed by Osgood-Schlatter disease (14.2%). More than 50% of injuries in young singles figure skaters involved overuse syndromes. Pairs skaters and ice dance skaters had a higher risk of acute injury than overuse syndrome because of falls from lifts and throw jumps. CONCLUSIONS: Programs to improve postural alignment, flexibility, and strength, especially during the asynchronous period of bone and soft tissue development, should be instituted to prevent and reduce overuse syndromes.

Gholve PA, Scher DM, et al. (2007). Osgood Schlatter syndrome. Curr Opin Pediatr **19**(1): 44-50.

PURPOSE OF REVIEW: Osgood Schlatter syndrome presents in growing children (boys, 12-15 years; girls, 8-12 years) with local pain, swelling and tenderness over the tibial tuberosity. Symptoms are exacerbated with sporting activities that involve jumping (basketball, volleyball, running) and/or on direct contact (e.g. kneeling). With increased participation of adolescent children in sports, we critically looked at the current literature to provide the best diagnostic and treatment guidelines. RECENT FINDINGS: Osgood Schlatter syndrome is a traction apophysitis of the tibial tubercle due to repetitive strain on the secondary ossification center of the tibial tuberosity. Radiographic changes include irregularity of apophysis with separation from the tibial tuberosity in early stages and fragmentation in the later stages. About 90% of patients respond well to nonoperative treatment that includes rest, icing, activity modification and rehabilitation exercises. In rare cases surgical excision of the ossicle and/or free cartilaginous material may give good results in skeletally mature patients, who remain symptomatic despite conservative measures. SUMMARY: Osgood Schlatter syndrome runs a self-limiting course, and usually complete recovery is expected with closure of the tibial growth plate. Overall prognosis for Osgood Schlatter syndrome is good, except for some discomfort in kneeling and activity restriction in a few cases.

Gigante A, Bevilacqua C, et al. (2003). Increased external tibial torsion in Osgood-Schlatter disease. Acta Orthop Scand **74**(4): 431-6.

We studied the relationship between Osgood-Schlatter disease and torsional abnormalities of the lower limb in 21 boys with this condition and 20 age- and sex-matched controls. 3 groups of knees (20 control knees, 21 symptomatic and 21 asymptomatic or less symptomatic knees) were subjected to clinical, radiographic and CT evaluation. We found no statistically significant differences between patients and controls, as regards femoral anteversion, patellar congruence angle, patellar tilt angle and anterior tibial tuberosity-trochlear groove distance, but the condylomalleolar angle and tibial torsion angle were greater in patients. We found no differences between symptomatic and asymptomatic or less symptomatic knees in any of the parameters. All the symptomatic knees were on the side preferentially involved in jumping and sprinting. This increase in external tibial torsion may play a role as a predisposing mechanical factor in the onset of Osgood-Schlatter disease in male athletes.

Hirano A, Fukubayashi T, et al. (2002). Magnetic resonance imaging of Osgood-Schlatter disease: the course of the disease. Skeletal Radiol **31**(6): 334-42.

OBJECTIVE: The purpose of this study was to clarify the nature of Osgood-Schlatter disease (OSD) using MR images. DESIGN: Thirty boys (40 knees) with OSD diagnosed by clinical symptoms and signs were investigated with MRI. Longitudinal evaluation was undertaken in 22 patients and the mean follow-up was 1.5+/-0.9 years. MR examinations were performed at least every 6 months in most cases. When a patient's symptoms changed, MRI was repeated and in cases where the initial MR examination showed an early or progressive stage of OSD, MRI was undertaken every month where possible. All MR examinations were performed in the sagittal plane with a 0.2 T imager. RESULTS: MR images were classified into five stages as follows: normal, early, progressive, terminal and healing. The stage of 11 knees (28%) did not change during the course of the study and 21 knees (53%) showed a change of at least one stage. Eight knees (20%) did not have follow-up MR studies. The initial MR examination was normal in nine knees. Eight knees were at the early stage at presentation. MR images showed edema-

like changes around the tibial tuberosity. Ten knees were classified as in the progressive stage at the initial presentation and six knees were classified in this group during progression on follow-up MRI. MR images showed partial avulsion of the secondary ossification center, which was seen to be being pulled proximally. Eleven knees were at the terminal stage on presentation, where the avulsed parts of the secondary ossification center had become completely separated. Two knees were classified as in the healing stage at presentation and 19 knees progressed to the healing stage from the normal, early and progressive stages. The MR images showed the separated part that did not create the ossicle had recovered by osseous healing. On the other hand, radiographs of the early stage appeared almost normal, and in the progressive stage could not show the avulsed parts. CONCLUSIONS: We clarified the progress of OSD with MRI. The process of OSD started from the apophyseal stage and a tear appeared in the secondary ossification center, widening to an opened shell-like shape. This damage progressed to an ossicle in some cases. In short, the ossicle was formed from an avulsed portion. It was very difficult to show the course of OSD with radiography. MR images were especially useful for revealing early and progressive lesions of OSD.

Krivickas LS (1997). Anatomical factors associated with overuse sports injuries. Sports Med **24**(2): 132-46.

Overuse injuries develop when repetitive stress to bone and musculotendinous structures damages tissue at a greater rate than that at which the body can repair itself. A combination of extrinsic factors, such as training errors and environmental factors, and intrinsic or anatomical factors, such as bony alignment of the extremities, flexibility deficits and ligamentous laxity, predispose athletes to develop overuse injuries. Malalignant of the lower extremity, including excess femoral anteversion, increased Q angle, lateral tibial torsion, tibia vara, genu varum or valgum, subtalar varus and excessive pronation are frequently cited as predisposing to knee extensor mechanism overuse injuries. These and other forms of malalignment have also been implicated in iliotibial band syndrome, medial tibial stress syndrome, lower extremity stress fractures and plantar fasciitis. Muscle inflexibility aggravates and predisposes to the development of a variety of overuse injuries, especially those occurring in children and adolescents, including the traction apophysitises. Flexibility deficits may be improved by an appropriate stretching programme. Unfortunately, lower extremity malalignment is less amenable to intervention. Orthotics are often prescribed to improve lower extremity alignment. However, studies have not shown that orthotics have any effect on knee alignment and, while they can alter subtalar joint alignment, the clinical benefit of this remains unclear. Awareness of anatomical factors that may predispose to overuse injuries allows the clinician to develop individual prehabilitation programmes designed to decrease the risk of overuse injury. In addition, the clinician can advise the athlete on the importance of avoiding extrinsic factors that may also predispose to overuse injury.

McKoy BE, Stanitski CL (2003). Acute tibial tubercle avulsion fractures. Orthop Clin North Am **34**(3): 397-403.

Acute tibial tubercle avulsion fractures are uncommon, and these injuries typically occur in mature-appearing adolescent boys involved in jumping sports, particularly basketball. The developmental anatomy of the tibial tuberosity and the changes surrounding normal physiologic epiphysiodesis render this structure susceptible to acute avulsion fractures. Possible associated injuries include patellar and quadriceps avulsions, collateral and cruciate ligament tears, and meniscal damage. The treatment of this injury is based on the amount of displacement and associated injuries. Nondisplaced fractures are treated

nonoperatively with cast immobilization. Displaced fractures require open reduction and internal fixation. Even in Type III injuries, the outcome is usually excellent.

Nikiforidis PA, Babis GC, et al. (2004). Avulsion fractures of the tibial tuberosity in adolescent athletes treated by internal fixation and tension band wiring. Knee Surg Sports Traumatol Arthrosc **12**(4): 271-6.

Avulsion of the tibial tuberosity is a rarely reported fracture. It is mainly considered as an athletic injury accounting for less than 3% of all epiphyseal lesions. In this study, we hypothesized that the use of tension band wiring as a supplement of the internal fixation for the avulsion fractures of the tibial tuberosity would lead the adolescent athletes to a more effective rehabilitation program and an earlier resumption of their previous activity level. Ten patients were treated in our department over a period of 11 years (1985-1995). Operative treatment was thought necessary for all our cases due to tibial tuberosity displacement. Open reduction and internal fixation in combination with tension band wiring was used. The result in all cases was that the reduction was maintained intact and the fracture united. The functional results were excellent, and all patients returned to their previous athletic activities. Our conclusion is that the combination of internal fixation and tension band wiring for avulsion fractures of the tibial tuberosity seems to be more effective and advantageous than conservative or other surgical methods. Avoiding the need of external support and allowing early joint motion, the method described prevents serious quadriceps atrophy, allowing the young athletes to return earlier to their previous sport activities.

Orava S, Malinen L, et al. (2000). Results of surgical treatment of unresolved Osgood-Schlatter lesion. Ann Chir Gynaecol **89**(4): 298-302.

BACKGROUND: We present our experience with surgical treatment of unresolved, painful, late Osgood-Schlatter disease. METHODS: In 70 operations performed in 67 patients (in three bilaterally) an ossicle under the distal patellar tendon was removed in 62 cases. In eight cases, excision of the prominent tibial tubercle and/or drilling of the epiphysis was performed. Additional procedures, such as rasping of the uneven anterior tibial surface, excision of inflammed bursa or the devitalized portion of the tendon, were done 21 times. Most patients were athletes or physically active young people. The mean age was 19.6 years. 54 operations were done on males and 16 on females. They had been followed preoperatively for 18 months and after surgery 2.2 years. RESULTS: The final results were excellent or good in 56, moderate in 9, poor in 3 and unknown in 2 cases. CONCLUSIONS: Osgood-Schlatter's disease may leave an ossicle under the distal patellar tendon, a prominent tibial tubercle or an uneven surface of anterior superior tibia. These may lead to pain and disability due to recurrent injuries or athletic exercises. Surgical treatment gives good results in chronic unresolved cases.

Peace KA, Lee JC, et al. (2006). Imaging the infrapatellar tendon in the elite athlete. Clin Radiol **61**(7): 570-8.

Extensor mechanism injuries constitute a major cause of anterior knee pain in the elite athlete. Sonography and magnetic resonance imaging (MRI) are the imaging methods of choice when assessing the infrapatellar tendon. A comprehensive imaging review of infrapatellar tendon normal anatomy, tendinopathy, and partial/full-thickness tendon tears is provided. The value of imaging the infrapatellar tendon in clinical practice, including whether sonography can predict symptoms in asymptomatic athletes, is discussed. Acute avulsion fractures, including periosteal sleeve avulsion, and chronic avulsion injuries, including Sinding-Larsen-Johansson and Osgood-Schlatter syndromes, are shown. Mimics of infrapatellar tendon pathology, including infrapatellar plica injury,

patellar tendon-lateral femoral condyle friction syndrome, and Hoffa's syndrome, are illustrated.

Pierets K, Verdonk R, et al. (1999). Jumper's knee: postoperative assessment. A retrospective clinical study. Knee Surg Sports Traumatol Arthrosc **7**(4): 239-42.

Jumper's knee or infrapatellar insertional tendinopathy is a condition primarily found in athletes between 18 and 25 years of age who are engaged in explosive running and jumping sports. It is caused by microtears or partial macrotears through the patellar tendon. Conservative treatment is used as the primary approach. If conservative measures are insufficient or fail to relieve the symptoms, surgery is indicated. The patellar tendon is incised and the hyaline inflammatory tissue is removed. Twenty-six patients have been studied retrospectively, with specific attention to postoperative resumption of sports and residual subjective and objective findings. They all completed a detailed questionnaire and subsequently underwent a physical and ultrasound examination.

Ross MD, Villard D (2003). Disability levels of college-aged men with a history of Osgood-Schlatter disease. J Strength Cond Res **17**(4): 659-63.

Osgood-Schlatter disease (OSD), which is a traction apophysitis of the tibial tuberosity, is one of the most common orthopedic conditions that adolescent athletes will encounter. Adolescent athletes with OSD typically present with pain, swelling, and tenderness over the tibial tuberosity that worsens with athletic activity. Few published reports have described the effects of OSD on the disability levels of athletes beyond adolescence. Therefore, the purpose of this study was to assess the disability levels of college-aged male subjects (n = 25, mean age = 20.3 years) who have a history of OSD and compare their status to a control group of healthy male subjects with no history of OSD (n = 25, mean age = 20.4 years) matched by intercollegiate sport and age. The mean time from being diagnosed with OSD to participation in this study was 7.6 +/- 2.4 years for subjects in the OSD group. All subjects completed the Knee Outcome Survey Activities of Daily Living Scale and Sports Activity Scale, which served as our measure of disability. The results indicated that subjects with a history of OSD scored significantly lower than subjects in the control group on both the Knee Outcome Survey Activities of Daily Living Scale and Sports Activity Scale, indicating that subjects with OSD experienced higher levels of disability than subjects in the control group.

Visuri T, Pihlajamaki HK, et al. (2007). Elongated patellae at the final stage of Osgood-Schlatter disease: A radiographic study. Knee.

Aetiology of Osgood-Schlatter disease (OSD) is still unknown. Relative length of the patellar articular surface with the length of the patella, relative height of the tibial tubercle with the sagittal diameter of the tibia, Insall-Salvati, Blackburne-Peel, and Caton-Deschamps indexes, as well as Grelsamer-morphology type of the patella were measured from preoperative plain X-rays in 82 knees of 20-year-old males with OSD and in 87 knees of 20-year-old male controls with normal MRI findings of the knee. Seventy-eight of the OSD patients had separate ossicles. Their mean patellar morphology index was 1.44 and that of the controls was 1.28 ($p<0.001$), indicating significant lengthening of the patellar body among the OSD group. OSD patients had also significantly more often Grelsamer type II (elongated patellae) than the controls. Tibial tuberosity was significantly higher among OSD patients, but was not correlated with the lengthening of the patella. An increased patellar height among OSD patients was shown by the Blackburne-Peel and Caton-Deschamps indexes ($p<0.001$) and the Insall-Salvati index ($p=0.018$). OSD patients exhibit elongated patellae and patellar

tendons which may result from long-standing tension of the extensor apparatus during growth spurt, when femoral growth exceeds that of the anterior structures of the knee.