

OSGOOD SCHLATTER OLAN GENÇ SPORCULARDA İZOKİNETİK
KAS KUVVE-Tİ VE EGZERSİZ (1)ISOKINETIC MUSCLE STRENGTH AND EXERCISE FOR OSGOOD
SCHLATTER DISEASE IN YOUNG ATHLETES

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Öz: Amaç: Osgood schlatter hastalığı, (OGS) ön diz ağrısının önemli nedenlerinden biridir. Spor aktivitelerinin kısıtlanması tedavide sıkça uygulanan bir yöntemdir. Bu araştırmanın amacı OGS sporcularının fiziksel aktivitelerini kısıtlamadan, performanslarını devam ettirme olasılığını incelemektir. **Yöntem:** Hastanemizde Mart-2017 ve Kasım 2017 tarihleri arasında spor hekimliği polikliniğine gelen 65 sporcunun verileri incelendi. Çalışmaya 60 sporcunun 60 dizi dâhil edildi. Sporcuların 23'ü dış merkezde OGS nedeniyle spor yapmaları yasaklanmıştı. İlk muayenelerinde tüm sporculara Cincinnati anketi yapıldı. Sporculara 6 haftalık egzersiz programı verildi. Kontrol muayenelerinde Cincinnati anketi ve Cybex Norm (CSMI Humac Norm, USA) dinamometresi ile izokinetik test yapıldı. Diz kas gücü 60 ve 180 derece / saniyede (° / sn) ölçüldü. Her iki ekstremitede ve konsant-rik modda kas kuvveti ölçümü yapıldı. Pik tork (PT), Toplam iş (TW), Pik tork / vücut ağırlığı (PT / BW) ve agonist / antagonist (AG / AN) oranı kaydedildi. **Bulgular:** Sporcu bırakanlar ile devam edenlerin anket sonuçları arasında istatistiksel olarak anlamlı bir fark bulunamadı. 60° / s' de spor yapmayı bırakanlarda PTE (p <0.03) ve PTF (p <0.01) değerleri düşük bulundu. Bununla birlikte, PT / BW E ve PT / BW F'nin ölçülen değerlerinde anlamlı bir fark bulunamadı. **Sonuç:** OGS tanısı alan sporcular spor müsabakalarından uzak kalmakta ve spor yapmaktan vazgeçmektedirler. Sporcular, sporu bırakmadan ve antrenmanı aksatmadan da spora devam edebilirler.

Anahtar Kelimeler: Osgood Schlatter, Sporcu, Cincinnati, İzokinetik Test

Aim: Osgood schlatter disease is one of the important causes of anterior knee pain. Restriction of sports activities is still a frequently applied method in treatment. The purpose of this study is to examine the possibility for OGS athletes to continue doing sports without restricting their physical activities. **Method:** We conducted a prospective study on 65 athletes who admitted to our setting between November and March 2017. Sixty knees in 60 athletes included in the study. Sports were forbid-den for 23 of the athletes due to OGS in the outer center. The Cincinnati survey was completed in the first examinations of the athletes. 6 weeks exercise program was applied. Cincinnati was again filled at the control examinations, and an isokinetic test with Cybex (CSMI Humac Norm, USA) dynamometer. Knee muscle strength was measured in 60-180 degrees/second. Peak torque (PT) Total work (TW), Peak torque/body weight (PT/BW) and the agonist/antagonist (AG/AN) ratio were recorded. **Results:** There was also no statistically significant difference between the two groups. Survey results of those who quit and those who continued. At 60°, we found statistically significant lower PTE (p <0.03) and PTF (p <0.01) values at those who quit sports than those who continued doing sports. However, we could not obtain a significant difference in the measured values of PT/BW E and PT/BW F. **Conclusions:** Athletes with knee OGS are away from sporting events and do not want to do sports. The athletes can continue doing sports without giving up sports and without even pausing the trainings.

Key Words: Osgood Schlatter, Athlete, Cincinnati, Isokinetic Test

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INTRODUCTION

Osgood Schlatter (OGS) is one of the important causes of anterior knee pain during the adolescence period. It often arises when growth is rapid and skeletal maturity is incomplete. The knee growth cartilage is located in 3 regions: growth plate, epiphysis (articular cartilage), apophysis (tendon inserting). It is thought that the growth plate is more susceptible to traction during childhood. The disease is spontaneously terminated when the ossification center of tuberosity of the tibia merges with tibia, and the complaints are reduced (14-17 years). The normal course is 6-18 months, and the symptoms may vary (Gholve et al., 2007: 44-50; Blankstein et al., 2001: 536-539; Flowers and Bhadreshwar, 1995: 292-297; Micheli, 1983:337-360; Wall, 1998: 29-34).

Clinically, tuberosity of the tibia is characterized by susceptibility, pain, swelling, and thickening of the patellar tendon attachment area. There is still no effective treatment method today even though it is a disease defined 100 years ago (Gholve et al., 2007: 44-50; De Lucena et al., 2011: 415-420).

Treatment must be adjusted according to the severity of symptoms, the age of the skeleton, and the sporting activities (Rostron and Calver, 1979: 627-8). Adolescent soccer players exhibit many musculoskeletal pathology

resulting from repeated biomechanical stress (Rössler et al., 2016: 309-317). The evidence in the literature suggests that muscle stretching exercises may be protective at many points, including the predisposition or the development of OGS. For this reason, stretching must be the basis of the exercise. Stretching and strengthening exercises attempt to maintain the balance between quadriceps, hamstrings, calf muscles, and iliotibial band (Gholve et al., 2007: 44-50; Weiler et al., 2011:343).

Analgesics (e.g., acetaminophen) or nonsteroidal anti-inflammatory drugs (e.g., Ibuprofen) may help to control pain. Injection is not recommended due to complications such as subcutaneous atrophy (Gholve et al., 2007: 44-50). By using patellar tendon bands as an accessory device, the weight on the tuberosity of the tibia is reduced, and it is protected from direct trauma (Wall, 1998: 29-34). ESWT (Extracorporeal Shock Wave Therapy) is among the safe and promising treatments for OGS-(Schwend and Geiger, 1998: 943-971). Osteocele excision, tubercle debridement, reduction osteotomy, tubercle resection, tubercle autologous bone peg, sequestrectomy and endoscopic debridement are among the surgical options for patients who do not benefit from conservative treatment (Lohrer et al., 2012: 218-222).



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OGS is a condition that is allowed to play with pain (Wall, 1998: 29-34). However, the discontinuation of sports is still a recommended treatment by many physicians. By reducing the running time and speed, and prohibiting jumping, they recommend movement restriction for 2-4 months (Eun et al., 2015: 416-421). Therefore; we aimed to examine the possibility for OGS athletes of continuing doing sports without restricting their physical activities. For athletes, to stop training means to leave sports altogether. Our hypothesis is that physical activity restriction in OGS treatment is not necessary.

MATERIALS and METHODS

A cross-sectional study of muscle strength measure in 65 athletes with knee OGS. After ethical approval, we conducted a prospective study on 65 athletes who admitted to our setting between November and March 2017. Athletes between the ages of 11 and 18, who performed isokinetic test, with adequate knee radiographs and could comply with the procedure were included in the study. Exclusion criteria were set as follows; known osteoarthritis, knee flexion less than 90°, prior rupture of the quadriceps tendon or known insufficiency, patients with neurological disorders, prior patellar fracture, prior patellar tendon rupture, prior patellar dislocation and prior knee operations with a known decrease on the patellar height, involving anterior cruciate re-

construction (ACL) surgery, high tibial osteotomy, and unilateral or total joint arthroplasty.

All clinical and radiographic evaluations were done by the same physician in the department of sports medicine. Athletes were dealing with 11 different sports types. 65 athletes (9 female, 56 male, mean of age 13.4 ± 1.8 years, mean of body mass index 20 kg/m^2) were examined. OGS was diagnosed based upon the history and physical examination with radiographic findings. Five athletes were removed from the study since they could not come to the ongoing controls and could not exercise regularly.

Twenty three of the athletes were forbidden to play sports due to OGS in the outer center. Thirty seven of them were continuing their active sports activities. Both knees were symptomatic in 14 of the 23 athletes, and 19 of the 37 athletes. The Cincinnati Knee Rating System was filled in the first examinations of the athletes. The isokinetic test could not be done because they had pain. Six week exercise program was suggested.

The athletes were told to warm-compress the area for 15 minutes before the activity and to apply ice for 20 minutes afterwards. None of the patients in the study had limited ROM. In order to prevent pain; static stretching at low density at the beginning, and then dynamic and PNF (Proprioceptive Neuromuscular



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Facilitation) stretching exercises were given. Hence hamstring loosening while quadriceps is stretched was aimed at by creating a reciprocal inhibition reflex. To increase the range of motion, the athletes were told to repeat the exercises 3 times, count up to 10 and do it 3 times a day. Isometric quadriceps exercises were performed in the early period. High intensity quadriceps exercises and hamstring stretching were started in the 2nd week. The patients were told to come to check if there was no improvement or if the symptoms got worse even though they had exercises for 7-10 days (Gholve et al., 2007: 44-50; Kujala et.al, 1985: 236-41; 13-15; Antich and Brewster, 1985: 5-10; Jakob et al., 1981: 579-82).

A patellar band was given in the first examinations. The patients were told that they should remove the patellar band during the night and during the exercises. The group who continued doing sports kept going with the training and matches. The athletes were called for control after 6 weeks. Cincinnati Knee Rating System was again filled during the control examinations, and an isokinetic test was performed to assess muscle strength. The athletes in both groups stated that their pain was diminishing. The 3 athletes who were told to quit sports returned to professional sports.

Knee muscle strength was measured in 60 and 180 degrees/second with isokinetic dynamometer Cybex Norm (CSMI Humac Norm, ABD). Subjects were fitted into the Cybex according to the manufacturer's protocols and given verbal instructions prior to begin the test. Isokinetic test procedure was started with initial ten warm up repetitions practiced while the patient was sitting upright on the chair to align the dynamometer and knee joint axis. To keep the right position, the athletes were strapped over the shoulder, waist, and thigh and proximal of the right ankle.

Athletes were seated upright on the chair with the axis of the dynamometer aligned to the knee joint axis. Then athletes were instructed to perform concentric knee exercise at a range of motion (ROM) from 0° to 90° of flexion. The isokinetic testing protocol was consisted of tests at three angular velocities of 60°, 120°/sec, with 10 repetitions. The initial five repetitions at each velocity were performed at sub maximal effort, and the last five were performed at maximum effort. Subjects were given both verbal encouragement and visual feedback during the familiarization trials.

There was 1 minute of rest intervals between successive repetitions (Figure1).

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Figure 1. Isokinetic Dynamometer Measuring

All tests were performed on both extremities and for concentric muscle strength. It were completed to assess maximum knee extensor and flexor torque (Peak torque (PT) in 60°, Total work (TW) 180°, Newton-meters (Nm)). We then divided each subjects' maximum torque (Nm) by their body mass in kilograms (kg) to obtain a normalized measure of strength (Peak torque/body weight (PT/BW)). And the agonist/antagonist (AG/AN, flexor /extensor, Hamstring /Quadriceps) ratio (%) were recorded (Koh and Herzog, 1998: 267-280 Baltzopoulos and Brodie, 1989: 101-16).

Normality of the variable distribution was tested with the Kolmogorov- Smirnov test. Statistic evaluations were made using independent samples't test on Statistical Package for the Social Sciences (SPSS) program version 22.0. (SPSS Inc., Chicago, IL, USA) p value, lower than 0.05 was considered as statistically significant.

RESULTS

The average age of the group who quit sports was 13.1 ± 1.4 ; and the average age of the group who continued was 13.7 ± 2.1 . There was no statistically significant difference between the groups ($p = 0.19$). The BMI of those who quit sports was 19.7 ± 2.7 and of those who continued was 20.4 ± 2.9 . There was no statistically significant difference between the groups ($p = 0.3$). There was no statistically significant difference between the Cincinnati Knee Rating System filled in the first examinations and the survey results obtained in the second visit ($p = 0.2$, $p = 0.6$) (table 1: Demographic characteristics and Cincinnati Knee Rating System results). In the control examinations, the pain complaints were reduced in two groups.

Athletes were dealing with 11 different sports types (table 2: Groups according to sports types of frequencies). There were training programs for at least 3 days a week for 2 hours a day.



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Table 1. Demographic Characteristics and Cincinati Results (Mean ± SD)

	quit sports	continued sports	p value
n (%)	23 (% 38)	37 (62)	
Age-(years)	13.1 ± 1.4	13.7 ± 2.1	0.1
BMI*	19.7 ± 2.7	20.4 ± 2.9	0.3
Cincinati 1	27.9 ± 3.5	28.9 ± 1.8	0.2
Cincinati 2	26.4 ± 3.9	26.9 ± 3.6	0.6

*BMI: Body Mass Index

Table 2. Groups According to Sports Types of Frequencies

	quit sports (n=23)	contin- ed sports (n=37)	Total (n=60)
Athletics	3 (%4.6)	1 (%1.5)	4 (%6.1)
Basketball	6 (%9.2)	10 (%15)	16 (%24.6)
Football	10 (%15)	15 (%23)	25 (%38.4)
Wrestling	1 (%1.5)	-	1 (%1.5)
Handball	1 (%1.5)	-	1 (%1.5)
Judo	1 (%1.5)	4 (%6.1)	5 (%7.6)
Volleyball	1 (%1.5)	1 (%1.5)	2 (%3)
Fencing	-	1 (%1.5)	1 (%1.5)
Gymnastics	-	1 (%1.5)	1 (%1.5)
Tennis	-	1 (%1.5)	1 (%1.5)
Swimming	-	3 (%4.6)	3 (%4.6)

We evaluated the strength of the knees of the athletes at angular velocity of 60 and their endurance at 180 degrees, with an isokinetic device. At 60 degrees, we found statistically significant lower PTE ($p < 0.03$) and PTF ($p < 0.01$) values at those who quit sports than

those who continued doing sports. However, we could not obtain a significant difference in the measured values of PT/BW E ($p = 0.71$) and PT/BW F ($p = 0.6$) by body weight. At 180 degrees, we found statistically significant lower TWE ($p < 0.02$) values at those who quit



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sports than those who continued doing sports. However, we could not obtain a significant difference in the measured values of TW/BW E ($p = 0.68$) by body weight. We could not

obtain a statistically significant difference in PTF, PT/BW F evaluations at 180 degrees (table3: Means of parameters evaluated by the isokinetic test)

Table 3. Means of Parameters Evaluated by The Isokinetic Test (Mean \pm SD)

	quit sports	continued sports	p value
Number of knees	23	37	
PT E 60°/s (Nm)	76.0 \pm 28.8	103.0 \pm 39.0	0.03*
PT/BW E 60°/s (Nm/kg)	144.0 \pm 49.0	163.0 \pm 61.0	0.22
PT F 60°/s (Nm)	42.0 \pm 18.0	57.0 \pm 22.0	0.01*
PT/BW F 60°/s (Nm/kg)	79.0 \pm 28.0	89.0 \pm 34.0	0.24
F/E ratio 60°/s (Nm)	60.0 \pm 24.0	57.0 \pm 14.0	0.49
TW E 180°/s (Nm)	618.0 \pm 206.0	770.0 \pm 315.0	0.02*
TW/BW E 180°/s (Nm/kg)	1174.0 \pm 411.0	1228.0 \pm 529.0	0.68
TW F 180°/s (Nm)	382.0 \pm 211.0	399.0 \pm 190.0	0.74
TW/BW F 180°/s (Nm/kg)	717.0 \pm 359.0	642 \pm 334.0	0.42
F/E ratio 180°/s (Nm)	64.0 \pm 31.0	57.0 \pm 27.0	0.32

PTE = peak torque extension-. PT/BW E = peak torque / Body weight extension. PTF= peak torque flexion-. PT/BWF = peak torque / Body weight flexion. -F/E ratio = flexor/extensor . TWE=Total work extension-. TW/BW E= Total work / Body weight extension. TWF= Total work flexion. -TW/BWF= Total work / Body weight flexion

* independent samples' t test * $p < 0.05$

DISCUSSION

There is no consensus on OGS treatment. In our work, we wanted to show that the athle-

tes who are diagnosed with OGS can continue doing sports without forbidding sports or even without lack of training. This study is the only study that evaluated the response of the athletes with OGS to exercise with a dynamometer. There was no statistically significant difference in knee strength and endurance between the groups that continued and quit sports. Although we found statistically significant differences in strength evaluations of those who continued sports, we did not find the same difference in the values measured according to body weight ($p < 0.3$, p



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<0.2). There was also no statistically significant difference between the Cincinnati Knee Rating System results of those who quit and those who continued (Cincinnati 1 $p < 0.2$, Cincinnati 2 $p < 0.6$).

When we look at the literature, there are many studies suggesting physical activity restriction. Hussain and Hagroo kept track of the course of the disease in 261 patients (365 symptomatic knees) for 24 months. 237 (90.8%) patients responded well to restriction of sports activities and nonsteroidal anti-inflammatory agents. Twenty-four patients who did not recover by conservative measures were surgically excised and returned to their normal activities after an average of 4.5 weeks (Perrin, 1993: 59-72). Mital et al., (1980: 732-739) mentioned another case series with 118 patients (151 knees), in which 88% responded to activity restriction. Fourteen of the 118 patients (fifteen knees) had ossicle proximal to the tuberosity of the tibia. The ossicle was surgically excised because there was no improvement in the follow-ups of these patients for a mean of 3.8 years. Only one of them (7%) did not return to complete relaxation and activity. When Yen et al., (2014: 1155-73) examined knee pain in child and adolescent athletes; they reported that OGS standard therapy was non-operative. They stated that ice application, activity restriction, oral anti-inflammatory drugs, physical

therapy applications and brace applications were carried out. The Gerulis et al., (2004: 363-9) study showed that restricting physical activity, load restriction and conservative treatment alone were more effective than load restriction and physical activity restriction. 171 OGS patients (10-27 years) were examined. The patients were divided into two groups: Conservative treatment and load restriction were applied to the first group (92 patients). In the second group (79 patients) there was no load restriction. Pain in the first group of patients decreased at 13 months, and in the second group it decreased at 16.5 months. In light of these studies, most doctors suggest activity restriction. But we do not think that this treatment is the correct application for the athlete.

Watanabe et al., (2018: 23) study showed that prevent OSD, it is necessary to address each factor that may be related to its onset (tightness in the quadriceps femoris muscle, support leg, diagnosis of severe disease and center of gravity distance).

However, there are also studies in the literature that support continued activity of the person. Adirim and Cheng (2003: 75-81) reported in their compilation work where they examined injuries in young athletes that among the OGS conservative treatment options, in addition to traditional treatment options (icing, NSAID, activity restriction,



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physical therapy), quadriceps flexibility exercises and patellar tendon band use also had positive impacts. Beovich and Fricker (1988: 11-13) stated that 91% of adolescent athletes reported that their symptoms were gone upon icing, aspirin and slight activity modification and only two patients had to give up sports. Krause et al. (1990: 65-68) tracked 50 patients (69 knees) for an average of 9 years. No treatment or activity restriction was offered. 36 patients (76%) had no restriction, but discomfort while squatting was observed in 60 %. Recent studies support activity despite pain. In our study, we have told the athletes to continue exercising and training within the pain limits which they could tolerate.

We could not find a prospective study that showed the complications that may arise when the athletes continue with activities. Complications and sequelae that may occur during the normal course of OGS are pseudarthrosis, genu recurvatum, patella alta, fragmentation/migration ossicles and permanent knee anterior pain (Vreju et al., 2010: 336-9). While tuberosity of the tibia fracture is frequently observed in athletes who jump, no causal link to OGS was found. Kujala (1985: 236-41) found that as a result of the survey on 68 young athletes, they had to pause trainings for an average of 3.2 months, and some stopped training for 7.3 months due to OGS. In another study, patellar bands were used in the tre-

atment of 24 knees in 17 patients with OGS. The patellar band was removed at night and during the inactive period, and was only used during activities. 79.1% success was achieved. Especially in bilateral cases, high level of patient satisfaction was found (Eun, 2015: 416-21). We suggested patellar tape patellar bands to all of our athletes.

There are many studies investigating the adaptation of skeletal muscles to resistance exercises. In these studies, even if the responses provided by lower and upper extremities to the exercise vary, no difference has been identified between genders. While there is not any apparent change in 4 weeks of exercise time, the response by lower extremity muscles to the exercise becomes more apparent after 6 weeks (Abe et al., 2000: 174-80). So, we assessed the response provided for the exercise at the end of 6 weeks in our study.

Our study had some limitations. We could not compare the information in the literature due to differences in symptoms, age groups, and lack of elaborate exercise modifications. We could have demonstrated the efficiency of the exercise by creating a group that was not given any exercises in our study. But we could not create a different group due to the limited number of patients. We could have used eccentric mode for isokinetic evaluation. But since this test has more risk of muscle injury, we did not prefer this mode.



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CONCLUSION

OGS follows a self-limiting course even when not interfered. It is a disease with a good prognosis. But it is desirable that athletes stop doing sports and even give it up altogether. In our study, we have reached the conclusion that athletes can continue doing sports without giving up sports and without even pausing the trainings. More studies are needed with a larger number of athletes so as to create a common protocol for treatment.

REFERENCES

ANTICH, T.J., BREWSTER, C.E., (1985).

Osgood-Schlatter Disease: Review of Literature and Physical Therapy Management. *J Orthop Sports Phys Ther*, 7(1): 5-10

ADIRIM, T.A., CHENG, T.L., (2003). Overview of injuries in the young athlete. *Sports Med*, 33(1): 75-81

ABE, T., DEHOYOS, D.V., POLLOCK, M.L., GARZARELLA, L., (2000). Time course for strength and muscle thickness changes following upper and lower body resistance training in men and women. *Eur J Appl Physiol*, 81(3): 174-80

BEOVICH, R., FRICKER, P.A., (1988). Osgood-Schlatter's disease a review of the literature and an Australian series. *Aust J Sci Med Sport*, 20: 11-13

BLANKSTEIN, A., COHEN, I., HEIM, M., DIAMANT, L., SALAI, M., CHECHICK, A., et al., (2001). Ultrasonography as a diagnostic modality in Osgood-Schlatter disease: A clinical study and review of the literature. *Arch Orthop Trauma Surg*, 121(9): 536-539

BALTZOPOULOS, V., BRODIE, D.A., (1989). Isokinetic Dynamometry Applications and Limitations. *Sports Medicine*, 8(2): 101-16

DE LUCENA, G.L., DOSSANTOSGOMES, C., GUERRA, R.O., (2011). Prevalence and associated factors of Osgood-Schlatter syndrome in a population-based sample of Brazilian adolescents. *Am J Sports Med*, 39: 415-420

EUN, S.S., LEE, S.A., KUMAR, R., SUL, E.J., LEE, S.H., AHN, J.H., et al., (2015). Direct Bursoscopic Ossicle Resection in Young and Active Patients with Unresolved Osgood-Schlatter Disease. *Arthroscopy*, 31(3): 416-21

FLOWERS, M.J., BHADRESHWAR, D.R., (1995). Tibial tuberosity excision for symptomatic Osgood-Schlatter disease. *J Pediatr Orthop*, 15(3): 292-297

GERULIS, V., KALESINSKAS, R., PRANCKEVICIUS, S., BIRGERIS, P., (2004). Importance of conservative treatment



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and physical load restriction to the course of Osgood-Schlatter's disease. *Medicina*, 40(4): 363-9

GHOLVE, P.A., SCHER, D.M., KHAKHARIA, S., WIDMANN, R.F., GREEN, D.W., (2007). Osgood Schlatter syndrome. *Curr Opin Pediatr*, 19(1): 44-50

HUSSAIN A, HAGROO GA. OSGOOD-SCHLATTER DISEASE., (1996). *Sports Exer Injury*, 2:202-206

JAKOB, R.P., VONGUMPPENBERG, S., ENGELHARDT, P., (1981). Does Osgood-Schlatter disease influence the position of the patella? *J Bone Joint Surg Br*, 63B(4):579-82

KRAUSE, B.L., WILLIAMS, J.P., CATTERALL, A., (1990). Natural history of Osgood-Schlatter disease. *J Pediatr Orthop*, 10(1):65-68

KUJALA, U.M., KVIST, M., HEINONEN, O., (1985). Osgood-Schlatter's disease in adolescent athletes. Retrospective study of incidence and duration. *Am J Sports Med*, 13(4): 236-41

KOH, T.J., HERZOG, W., (1998). Excursion is important in regulating sarcomere number in the growing rabbit tibialis anterior. *J Physiol*, 508(1): 267-280

LOHRER, H., NAUCK, T., SCHÖLL, J., ZWERVER, J., MALLIAROPOULOS, N., (2012). Extracorporeal shockwave therapy for patients suffering from recalcitrant Osgood-Schlatterdisease. *Sportverletz Sportschaden*, 26(4): 218-22

MICHELI, L.J., (1983). Overuse injuries in children's sports: the growth factor. *Orthop Clin North Am*, 14(2): 337-360

MITAL MA, MATZA RA, COHEN J., (1980). The so-called unresolved Osgood-Schlatter lesion: a concept based on fifteen surgically treated lesions. *J Bone Joint Surg Am*, 62: 732-739

PERRIN, D.H., (1993). Isokinetic exercise and assessment. Champaign (IL): Human Kinetics, ss: 59-72

ROSTRON, P.K., CALVER, R.F., (1979). Subcutaneous atrophy following methylprednisolone injection in Osgood-Schlatter epiphysitis. *J Bone Joint Surg Am*, 61(4):627-8

RÖSSLER R, JUNGE A, CHOMIAK J, DVORAK J, FAUDE O., (2016). Soccer injuries in players aged 7 to 12 years. *Am J Sports Med*, 44(2): 309-317

SCHWEND, R.M., GEIGER, J., (1998). Outpatient pediatric orthopedics. Common and important conditions. *Pediatr Clin North Am*, 45(4): 943-71



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WALL, E.J., (1998). Osgood-schlatter disease: practical treatment for a self-limiting condition. Phys Sports med, 26(3): 29-34

WATANABE, H., FUJII, M., YOSHIMOTO, M., ABE H., TODA, N., HIGASHIYAMA, R., TAKAHIRA, N., (2018). Pathogenic Factors Associated With Osgood-Schlatter Disease in Adolescent Male Soccer Players: A Prospective Cohort Study Orthop J Sports Med, Aug; 6(8): 2325967118792192

WEILER, R., INGRAM, M., WOLMAN, R., (2011). 10-Minute Consultation. Osgood-Schlatter disease. BMJ, 1; 343: d4534

VREJU, F., CIUREA, P., ROSU, A., (2010). Osgood-Schlatter disease–ultrasonographic diagnostic. Med Ultrason, 12(4): 336-9

YEN, Y.M., (2014). Assessment and treatment of knee pain in the child and adolescent athlete. Pediatr Clin North Am, 61(6): 1155-73

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