

# Patellar angle in Osgood-Schlatter disease

Ramesh K. Sen, L. R. Sharma, S. R. Thakur and V. P. Lakhanpal

A new patellar angle is described in lateral radiographs of the knee joint. One line is drawn along the articular surface of the patella and another from the end of the inferior articular cartilage to the patellar apex. The angle formed by these two lines averaged 33° in 68 knees joints afflicted with Osgood-Schlatter disease and 47° in 71 age-matched controls and 198 adult controls. The small angle in Osgood-Schlatter disease is proposed to be an important factor in the pathogenesis of the traction apophysitis.

Osgood (1903) and Schlatter (1903) independently described the condition tibial apophysitis. The condition has been interpreted as traction apophysitis with mechanical overpull of the tibial tuberosity (Cole 1937, Ehrenberg 1962, Singh and Prakash 1981, Jakob et al. 1981). The patella has often been blamed in this disease for being situated either higher or lower, and various methods to measure the patellar position have been described (Blumensaat 1938, Insall and Salvati 1971, Blackburne and Pell 1977, Norman et al. 1983). So far, the angle formed by the line joining the apex and inferior articular corner over the line of articular surface of the patella has not been described and correlated with Osgood-Schlatter disease. We have assessed the correlation of this new patellar angle with tibial apophysitis of adolescents.

## Patients and methods

In true lateral radiographs of knee joints, a line was drawn along the articular surface of the patella. Another line was drawn from the inferior margin of the articular cartilage to the apex of the patella (Figure 1). The angle formed by these two lines was measured in 68 knee joints afflicted with Osgood-Schlatter disease in 47 patients who attended our outpatient department from 1982 through 1985. Among these, 38 were males (55 knees) and 9 females (13 knees). The disease was unilateral in 26 patients (21 males and 5 females). In 14 patients the radiographs of the unaffected knee were available. The median age of the patients was 15 (13-18) years.

The angle was also measured in age-matched ado-

lescents and adults as controls. Thirty-eight adolescents attending the outpatient department for various knee injuries and 33 adolescent volunteers from a local school were radiographed for a lateral view of the non-injured knee; in those with a knee injury the unaffected side was used. Among these 71 age-matched controls, there were 44 males and 27 females with a median age of 15 (12-19) years.

The 198 radiographs of adults taken as controls were selected from patients who were admitted to our department for various problems not affecting the patella (62 patients had internal derangement of the knee, 48 had fracture of the femoral shaft, 60 had tibial fractures, and 18 had various other problems). Of these 198 adult controls, 133 were males and 65 were females with a median age of 32 (21-58) years.

The Student's *t*-test was used.

## Results

The mean patellar angle in Osgood-Schlatter disease was less ( $P < 0.001$ ) when compared with age-matched and adult controls (Table 1) even when males and females were assessed separately.

## Discussion

Our observation of a smaller patellar angle in patients with Osgood-Schlatter disease can be taken as evidence to support the view that the smaller the angle, the more the quadriceps muscle must contract to perform the same function. This increased pull due to a smaller angle may be an etiologic factor in this traction apophysitis. The observation of Jakob et al. (1981) that patients with Osgood-Schlatter disease have higher tone in the quadriceps muscle also favors our view.

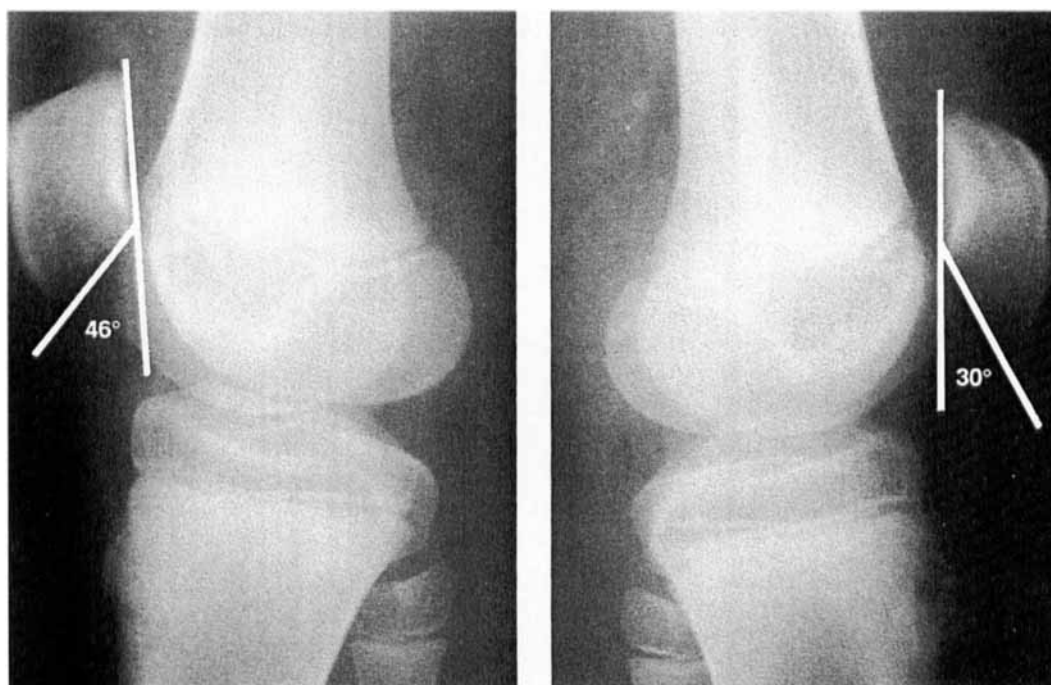


Figure 1. A 15-year-old boy with left-sided Osgood-Schlatter disease.

Table 1. Patellar angle in Osgood-Schlatter disease

	Males			Females		
	n	Mean	SEM	n	Mean	SEM
All affected knees	55	33	0.78	13	36	2.17
Unilateral disease						
Affected knees	21	34	1.17	5	42	3.10
Nonaffected knees	14	36	1.46	3	43	3.03
Age matched controls	44	46	1.03	27	49	1.23
Adult controls	133	45	0.58	65	52	0.98

Although no attempt has been made in the present study to correlate patellar position in knee joints of patients and controls, it is felt that patella alta in Osgood-Schlatter disease (Cole 1937, Smillie 1980, Jakob et al. 1981) may be due to continuous increased pull of the quadriceps muscle due to low patellar angle.

We conclude that the described patellar angle is different in patients with Osgood-Schlatter disease, and maybe an etiologic factor.

## References

- Blackburne JS, Peel TE. A new method of measuring patellar height. *J Bone Joint Surg (Br)* 1977;59(2):241-2.
- Blumensaat C. Die Lageabweichungen und Verrenkungen der Kniescheibe. *Ergebn Chir Orthop* 1938;31:149-223.
- Cole JP. A study of Osgood-Schlatter disease. *Surg Gynecol Obstet* 1937;65:55-67.
- Ehrenberg G. The Osgood-Schlatter lesion. A clinical and experimental study. *Acta Chir Scand* 1962;(Suppl 288).
- Insall J, Salvati E. Patella position in the normal knee joint. *Radiology* 1971;101(1):101-4.
- Jakob RP, von Gumpfenberg S, Engelhardt P. Does Osgood-Schlatter disease influence the position of the patella? *J Bone Joint Surg (Br)* 1981;63(4):579-82.
- Norman O, Egund N, Ekelund L, Rünow A. The vertical position of the patella. *Acta Orthop Scand* 1983;54(6):908-13.
- Osgood R B. Lesions of the tibial tubercle occurring during adolescence. *Boston Med Surg J* 1903;148:114-7.
- Schlatter C. Verletzungen des schnabelförmigen Fortsatzes der oberen Tibiaepiphyse. *Brunns' Beitr Klin Chir* 1903;38:874-87.
- Singh K, Prakash V. Osgood-Schlatter disease. *Indian J Orthop* 1981;15:32-7.
- Smillie IS. Diseases of the knee joint. 2nd ed. Churchill Livingstone, Edinburgh 1980:59-60.