

Anterior Knee Pain

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A different Source of AKP – Interesting Case History

“Jan” is a 34 year old hockey player at Briars in Sydney. Toward the end of a recent season, she asked me to look at a painful problem which had developed in her left knee, & was making it very difficult for her to run. Her left knee had never troubled her before. It was immediately obvious that she had a ‘lump’ on her superolateral patella. She was very tender at the insertion of her vastus lateralis. However the lump was part of the bone, and on closer palpation she seemed to have a ‘heart shaped’ irregularity of the patella. I wondered whether she might have a painful bipartite patella, & an XRay confirmed that this was the case. It may have become symptomatic during the season when she was inadvertently unloading her painful right knee, thus loading up more on her left. (She had consulted me pre-season with a right inferior patellar tendinopathy. This was successfully treated in-season). Or it may just have been because of the strenuous sport that she plays.

Jan was treated with standard RICE, a short period of unloading, soft-tissue techniques, then graduated static progressed to dynamic strengthening. Her pain settled soon after season-end and has not troubled her again (two seasons later at time of writing).

Literature Review: Bipartite (or the less common tripartite) patella has a reported incidence of between 0.05% & 6% in the general & military population (1,2,3,5,8). Only around 2% of these become symptomatic (2,8). Symptoms may arise after direct trauma, or as a gradual onset, and are almost always related to strenuous sporting or other activity (6,7). The pain is generally believed to be due to excessive mobility of the accessory bone (4,6). Symptoms normally arise in people under 20 years (2), with the average age of onset being 15.5years (7). In a study quoted by Kavanagh et al, the average time from start of symptoms to diagnosis was 2 years (3). There will be anterior knee pain on walking up hills or stairs, squatting, jumping, & in particular with sustained

crouched positions (2). This is a position Jan’s sport places her in regularly.

In childhood development, the patella begins as a cartilaginous structure, and starts to ossify between 3 & 6 years of age (2,3,7). It does so from one centre in 77% (2), & from 2 to 3 centres in between 15% to 23% of children (2,5). When secondary ossification centres do arise, they are generally seen at around 12 years. Most of these fuse completely during the 2nd decade, while 2-6% remain dissociated (2). The reason some fail to fully ossify is speculative. Fulkerson believes excessive muscle traction, (possibly due to strenuous activity or biomechanical factors) during a critical time in its

formation, may be a contributing factor (1). The condition is bilateral in approximately 50% of cases (2,5,8), and occurs more commonly in males at a rate of around 3:1 (3,5,7) or as high as 9:1 (2). Plain XRay is adequate to identify the presence of bipartite patella, with AP views clearly showing the fragment. Skyline views, comparing non-weight-bearing & squatted weight-bearing positions, can be helpful in determining the amount of functional separation. However to definitively show that the bipartite fragment is the source of symptoms, fat-suppressed T2-weighted MRI is the image of choice. This will show bone marrow oedema within the



separated fragment (2,3,5). Kavanagh found the presence of oedema in 66% of cases of suspected symptomatic bipartite patella. In the remaining cases, 72% had another cause of pain identified (3). O'Brien et al imaged 25 asymptomatic subjects, & found no cases of oedema. They concluded that the presence of oedema clearly signifies pathology (5). These authors also reported that asymptomatic patients had less than 2mm separation between fragments, & the secondary fragment tended to be small. The degree of separation may be a factor in both diagnosis & in determining the best treatment option. Bone scan has been advocated in the past, but has poor specificity. While 100% of symptomatic cases had a positive scan, so did 81% of asymptomatic knees (2). Based on the 1920's Saupe classification, there are three types of bipartite patella (2,7):

Type I: The separate fragment is at the inferior pole. This is said to represent 5% of cases (2). Oohashi et al question the existence of this type, citing only a few cases in the literature which they feel may have been a misdiagnosed apophysitis (7).

Type II: Lateral fragment. This represents 20% of cases (2). The fragment may be susceptible to lateral retinacular stress during bending (2).

Type III: The fragment is superolateral. This represents 75% of cases of bipartite patella (2). Excessive tension from VL is believed to be the main contributing factor to both the failed union & the symptomatology (1,2,6).



Most authors report that conservative management is successful in the vast majority of patients who develop a symptomatic bipartite patella (1,2,8). This includes a combination of rest, anti-inflammatory medication, taping or bracing, quadriceps stretching, and graduated exercises. For those who do not respond to conservative measures, a few surgical procedures have been described, all with reported good results. The procedures are:

1. Excision: This is the most common procedure performed, and is said to be technically straight-forward (8). In particular, it may be considered in cases where the secondary fragment is small and irregular, and there is clear separation between the secondary & primary bones with obvious mobility (2,6). There is concern about

performing an excision when the fragment is large, as there may be significant loss of articular cartilage surface area. However Weckstrom et al reported good & excellent results in all but one of 32 military recruits who had this procedure, some with large fragments. They were followed-up for between 12 to 18 years, with no return of symptoms or evidence of osteoarthritis (8).

2. Lateral retinacular release: This procedure also has good reported results (2,4). The concern is that it may lead to abnormal patellar tracking and secondary patellofemoral symptoms. In adolescents & teenagers, there is the hope of subsequent bony union of the fragment within 6 to 8 months post-surgery (2,4). In one study, 94% with an average age of 16.5 years, had bony union at 8 month follow-up (4).
3. VL release: This procedure was developed specifically for type III bipartite patella, as the pain in the superolateral fragment is felt to be generated by excessive tension from the VL. However there is some concern that this procedure may lead to an imbalance of forces between the medial and lateral passive & dynamic restraints. Ogata describes excellent results with a technique where only the subperiosteal insertion into the fragment is divided, leaving the main attachment to the primary bone intact (6). Fulkerson also favours VL release, & advocates reattachment of the VL to the central quadriceps tendon (1). Post-operative bony union has been reported (2,6).
4. Open reduction & internal fixation: This procedure may be warranted when the fragment is large & there is little separation (2). However there have been few reported cases and poor long-term follow-up.

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