check

Independent learning program for GPs

Unit 587
October 2021

Sports medicine

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We acknowledge the Traditional Custodians of the lands and seas on which we work and live, and pay our respects to Elders, past, present and future.

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Sports medicine

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The five domains of general practice

- Communication skills and the patient–doctor relationship
- Applied professional knowledge and skills
- Population health and the context of general practice
- Professional and ethical role
- Organisational and legal dimensions

RACGP

About this activity

Although physical activity, including sports, is an important component of a healthy lifestyle, general practitioners (GPs) have a significant role in managing injuries arising from sporting activities. In 2014–15, musculoskeletal conditions accounted for 19 per 100 general practice encounters.[1] In addition, there were 58,500 people hospitalised for a sports injury in 2016–17.[2]

One study found that approximately 16.5% of concussions in people aged >15 years are sports related.[3] Rates are highest among athletes who play Australian Rules football, rugby league and rugby union, ranging from three to 10 concussive injuries per 1000 player hours, or five injuries per team per season.[4]

Osgood-Schlatter disease is the most common cause of knee pain in young people aged 10–15 years.[5] Although it is a self-limiting condition, it is important to consider patient goals when developing a management plan.

Achilles tendon injuries have become more common over the past three decades, most likely due to increased participation in sports and exercise programs combined with an active, ageing population. Overuse injuries are particularly common in runners, with an annual incidence of up to 9%.[6]

This edition of *check* considers the application of sports medicine in general practice.

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Learning outcomes

At the end of this activity, participants will be able to:

- outline the management of a patient with suspected concussion, with particular focus on the use of the SCAT5 tool
- discuss the process of determining the cause of knee pain in an athletic adolescent
- identify the primary imaging modality for suspected pathology of the Achilles tendon.

Authors

Case 1

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Abbreviations

CAM	controlled ankle motion
CrCl	creatinine clearance
CT	computed tomography
DVT	deep vein thrombosis
GCS	Glasgow Coma Scale
GP	general practitioner
INR	international normalised ratio
LMWH	low molecular weight heparin
OSD	Osgood–Schlatter disease
SCAT5	Sport Concussion Assessment Tool – 5th Edition (SCAT5)
SRC	sports-related concussion

CASE

1 Andrew doesn't feel 'quite right'

Andrew, aged 22 years, presents to you the day after playing a game of football (soccer). In the first half of the game, he tried to head a ball but missed and fell heavily onto the right side of his body. He states the impact 'jolted' his entire body and head; he then 'didn't feel quite right' for approximately 10–15 minutes but then 'came good'. A similar episode occurred in the second half when he again attempted to head the ball but missed and landed on his back. He states he felt his 'entire body and head jolt'. He again 'didn't feel quite right' and ended up with a headache, which is getting worse. He states that he was a 'little confused' for a few hours after the game. Andrew tells you the team doctor assessed him after the game and conducted a Sport Concussion Assessment Tool – 5th Edition (SCAT5), which he gave to Andrew, and told him to see you today for review.

Andrew is a third-year student studying engineering at university. He lives with both parents and his sister, aged 24 years.

His health is otherwise good. He has no other significant medical history, does not smoke and drinks approximately five standard drinks on most weekends.

Question 1

What is the SCAT5, and how is it used?

Question 2

How would you proceed with this consultation?

Further information

The SCAT5 indicates the following.

On-field assessment

- Glasgow Coma Score = 14 (E4 V4 M6)
- No other significant clinical findings
- Normal neurological examination
- No midline cervical spine tenderness

Off-field assessment

- Symptom evaluation:
  - Total number of symptoms = 12/22
  - Symptom severity score = 41/132
  - Subjective feeling: 'In a fog and don't feel quite right, feeling nauseous, confused and a headache too.'
- Cognitive screening:
  - Orientation
    - 3 correct out of 5
  - Immediate memory
    - 9 correct out of 30
  - Digits backwards
    - 1 correct out of 4
  - Concentration total score = 1/5
- Neurological screen:
  - Balance examination
    - 15 errors
  - Delayed recall
    - 2 correct out of 10

On review of the SCAT5 undertaken by the team doctor and given the history of the injury, the most likely diagnosis is sports-related concussion (SRC).

Question 3

How would you proceed with your history and examination?

Further information

Andrew tells you he did not lose consciousness and that no seizure activity was witnessed (all information was verified when you contacted his team doctor). However, he did vomit once immediately after the game, once approximately three hours after the game and once before going to bed last night and still feels 'a little uneasy in the stomach'. He states he did not hit his head. He remembers all events surrounding the two falls and says he played the entire game. He does not report any midline cervical spine tenderness, and he can actively rotate his neck past 45 degrees on each side. You do not identify any significant injuries or abnormalities other than slight grazing to his right arm, right scapula region and right shoulder.

You undertake serial testing for Andrew using the SCAT5. The findings are as follows:

On-field assessment

- Glasgow Coma Score = 14 (E4 V4 M6)
- Normal neurological examination
- No midline cervical spine tenderness

Off-field assessment

- Symptom evaluation:
  - Total number of symptoms = 12/22
  - Symptom severity score = 34/132
  - Subjective feeling: 'I feel a bit better than yesterday, although I still feel odd in the head and not right. I have trouble remembering simple stuff and feel really exhausted.'
- Cognitive screening:
  - Orientation
    - 4 correct out of 5
  - Immediate memory
    - 16 correct out of 30
  - Digits backwards
    - 2 correct out of 4
  - Concentration total score = 2/5
- Neurological screen:
  - Balance examination
    - 8 errors
  - Delayed recall
    - 4 correct out of 10

The remainder of Andrew's physical examination is unremarkable. His vital signs are all within normal ranges.

Further questioning reveals Andrew has had similar injuries in the past with very similar symptoms, although he states he 'eventually came good'.

Question 4

What conditions would you consider as part of your differential diagnosis? How would you attempt to rule these in or out?

Further information

You refer Andrew for a non-contrast computed tomography (CT) scan of the brain, to help exclude your differential diagnosis. Results are reported as 'no acute intracranial injuries … no abnormalities detected'.

Question 5

What is your interpretation of the results so far?

Question 6

How would you manage Andrew's condition?

Question 7

Are any further investigations required?

Further information

Andrew is keen to return to sport as soon as possible.

Question 8

What are your recommendations, and how will you oversee Andrew's return to sport?

CASE 1 Answers

Answer 1

The SCAT5 (https://bjsm.bmj.com/content/bjsports/early/2017/04/26/bjsports-2017-097506SCAT5.full.pdf) is a preliminary concussion screening test for players aged ≥13 years.[1,2] The Child SCAT5 is used for players aged <13 years.[1,3] The SCAT5 includes detailed tests of cognitive and neurological function, including the Maddocks questions[4] and the Standardised Assessment of Concussion.[5] The SCAT5 and Child SCAT5 are designed for use by only doctors and licensed healthcare professionals, who must be familiar with both tools and how and when to apply and interpret them correctly. Page 7 of the SCAT5 provides an explanation of the tests, how to conduct them and how to interpret them.

In the sporting context, orientation questions involving time, place and person are unreliable and should not be used.[4] The SCAT5 and Child SCAT5 are divided into on-field and off-field assessments, with the off-field assessment being more detailed. In addition to the initial SCAT5 or Child SCAT5, further assessment must always be performed. The re-assessment process includes a thorough clinical re-assessment, determination of the need for neuroimaging and neuropsychological assessment using web-based tools such as CogSport[6] or CogState.[7] The SCAT5 and Child SCAT5 also outline a stepwise strategy for return to sport and/or school.

Answer 2

It is important initially that accurate, focused history-taking occurs. The questioning should concentrate on the events surrounding the injury including the actual mechanism and any symptoms Andrew is experiencing.

The priority must always be to attempt to rule in or rule out any potentially serious and life-threatening conditions.

Given that Andrew has presented with the SCAT5 that was conducted by the team doctor yesterday, you also have an opportunity to review his post-game results.

Answer 3

The intention at this stage is to undertake both a focused history and focused examination led by the information you currently have. It is important to clearly appreciate the sequence of events leading up to, during and following the injuries. This includes loss of consciousness, amnesia, seizure activity and history of concussions, as these can affect Andrew's recovery as well as the need for additional investigations or referrals.

The mechanism of injury is important to understand as it can help predict injuries sustained and the likelihood of the evolution of certain conditions. It may be appropriate at this stage to contact Andrew's team doctor to corroborate the information Andrew has provided and identify any other relevant information.

Other important information to ascertain would include:

- history of concussions, details of previous episodes and any risk factors for concussion symptoms
- what specific advice and/or management was provided and what tests were conducted at the time of the injuries (eg a sideline concussion assessment tool)
- a clear understanding of what Andrew perceives as his main concerns regarding his current condition and what his specific symptoms are
- how Andrew's symptoms affect his ability to undertake his usual university duties, hobbies or activities of daily living
- what sports Andrew plays and at what level – what are his motivations and timeframes for returning to sport and what other stakeholders (coaches, parents, allied health professionals, etc) are involved.

In this particular case and as part of the focused history and examination, the Glasgow Coma Scale (GCS) should be included. As described by Jain and Iverson (licensed under CC BY 4.0, https://creativecommons.org/licenses/by/4.0):[8]

> *The GCS is used to objectively describe the extent of impaired consciousness in patients with all types of acute medical and trauma patients. The GCS assesses patients according to three aspects of responsiveness: best eye-opening, best motor response and best verbal response. Reporting each of these separately provides a clear, communicable picture of a patient's conscious level. The findings in each component of the scale can aggregate into a total Glasgow Coma Score, which gives a less detailed description but can provide a useful summary of the overall severity.*

Although not formally a component of the GCS, pupillary response is also an important finding to include when performing a GCS. The aggregate score is a crude reflection of severity of traumatic brain injury, with a minimum possible score of 3 and a maximum of 15:

- severe: Glasgow Coma Score 3–8
- moderate: Glasgow Coma Score 9–12
- mild: Glasgow Coma Score 13–15.

Answer 4

With any head injury, the clinician must consider the likelihood of a serious intracranial event or serious injury of surrounding structures such as the cervical spine. The use of both the Canadian CT Head Rule[9] and the Canadian C-Spine Rule[10] may assist with risk stratification and decision making regarding the need for imaging. In this case, Andrew qualifies for a head CT scan as he has had three episodes of vomiting and scored 14 on his GCS shortly after the event and also at the time of your examination today. He does not fulfill the criteria for a cervical spine CT scan.

Answer 5

Significant intracranial and cervical spine injuries have essentially been excluded. Given the history, examination, investigations and the results of the SCAT5, the current working diagnosis is an SRC.

SRC is a traumatic brain injury induced by biomechanical forces. Subsequently, the impact received to the head may be direct or indirect, and loss of consciousness may or may not be a feature. There is typically short-lived and potentially subtle impairment of neurological function that resolves spontaneously, although both the timeline and symptoms are variable and individualised. It is important to note that the majority of SRCs occur without loss of consciousness or frank neurological signs.[1]

Currently there is no gold-standard diagnostic tool for SRC.

Answer 6

Following the diagnosis of an SRC, there should be a period of physical rest and relative cognitive rest for 24–48 hours. After this initial phase, the patient may be encouraged to become gradually and progressively more physically and/or cognitively active, as long as symptoms do not worsen. Rehabilitation following an SRC is dependent on the symptoms experienced, the stage following the injury and the athlete's individual demands.

Minor symptoms such as pain may be managed with simple analgesia. If nausea persists, this may be alleviated with the use of antiemetics. Andrew's wounds should be cleaned and dressed, and his immunisation status checked. With Andrew's consent, informing his coach, team doctor, team physiotherapist and family of his current status, management plan and warning signs to watch for is appropriate.

Answer 7

There is no need for further investigations at this stage. Best practice would suggest that serial assessment using the SCAT5 is indicated every 24 hours. It is appreciated that the 24-hour frequency for assessment may be difficult for both the patient and the GP. If appropriate, and with the support of his team doctor, family, coach and/or friends, Andrew may be able to self-monitor and alert his GP or team doctor if at any time his condition changes or he or his family or coach have any concerns. Andrew can self-monitor using such resources as HeadCheck (www.headcheck.com.au). It is important to ensure that Andrew and his family are made aware of and understand the information provided on page 6 of the SCAT5. If he does not present sooner, you should review Andrew in 5–7 days.

Answer 8

A graduated return to sport and/or work is a stepwise rehabilitation strategy and is outlined on page 8 of the SCAT5.[1,2] In general, each step of the strategy should take 24 hours to complete. Progression through the stepwise program should take a minimum of one week before a return to usual activities, or 14 days for children. Most sporting codes will have their own time frames between stages and when it is safe to return to sport. Subsequently, it is important for both the patient, coach and treating doctor to be aware of the sport-specific guidelines. If concussion symptoms are worsened at any stage of the program, then the patient must step back to a point at which their symptoms are not worsened by the increased activity and recommence progression from that stage. Increased severity of symptoms in the first 24–72 hours following injury (the acute phase) is the strongest predictor of a slow recovery.[1]

It is important to involve members of a multidisciplinary team early in the rehabilitation process, such as a physiotherapist who is able to prescribe appropriate return-to-sport activity consistent with the stepwise progression of the SCAT5.

Determining complete recovery is difficult, and it is likely that the physiological and psychological time to recovery is much longer than clinical recovery time. Andrew must not return to pre-injury cognitive and physical exertion until completely symptom-free.

Rehabilitation following an SRC is dependent on the symptoms experienced, the stage following the injury and the athlete's individual demands. Rehabilitation should be multidisciplinary where possible, and consideration should be given to the physical, cognitive, psychological, social and individual needs of the athlete, as well as their sporting demands. Symptoms that are present after two weeks in an adult, and four weeks in a child, following an SRC mandate referral. If possible, the athlete should be referred to a collaborative multidisciplinary facility skilled in managing SRC in such cases.

There is evidence showing the likely connection between repeated episodes of concussion and cognitive impairment, depression, suicide and chronic traumatic encephalopathy.[11–15] Subsequently, SRC has become an area of significant concern and interest for athletes, sporting organisations, governments, the media, doctors and the legal profession.

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CASE

2 Togashi has right knee pain

Togashi, aged 15 years, is brought to see you by his father for right knee pain. Togashi reports dull pain at the front of the right knee on the lower side, which increases when he plays sports. The pain has been present for more than six months. There has been no known trauma to the knee. Togashi is an aspiring athlete who wishes to compete professionally in sports. Togashi has sports training for football or basketball on most days of the week.

Question 1

What further history would you take?

Question 2

What are the important points to consider in physical examination of the knee in an adolescent?

Question 3

What relevant conditions would you include in the differential diagnosis?

Further information

There are no red flags in Togashi's history. Examination of the knee is unremarkable, with mild tenderness and prominence over the tibial tuberosity. The rest of the examination of the knee and hip is normal.

Question 4

What is your likely diagnosis, its aetiology and further investigation of this condition?

Further information

Togashi's father has always been supportive of him and wants him to accomplish excellence in competitive sports. Both Togashi and his father are worried about long-term effects of Osgood–Schlatter disease (OSD). They wish to know how long it will take Togashi to fully recover and whether any restriction from sports is required.

Question 5

How will you respond?

Further information

Over the next two years, Togashi undergoes sports rehabilitation with a physiotherapist and exercise physiologist, leading to resolution of his OSD and full return to sports. One day, during a basketball training session, Togashi is pushed

during a jump and falls onto his right knee. Togashi feels severe pain in his knee and is unable to weight bear or move his knee following this. Plain radiographs of his knee show a tibial tubercule avulsion fracture.

Question 6

What are main features of this condition?

CASE 2 Answers

Answer 1

The history should include:[1]

- age of the patient
- site of pain
- onset and duration of symptoms
- character and radiance of pain
- systemic symptoms such as fever, nausea or vomiting
- any decrease in range of movement
- any associated swelling of the knee
- previous trauma to the knee or pop sensation with severe pain
- past surgeries to the knee
- history of arthritis in the patient or their family
- current or previous pain or swelling in other joints, skin rashes, insect bites or any other issues
- triggers for pain such as jumping, acceleration, kneeling
- catching, locking or giving way.

Clinicians should look for signs and symptoms requiring urgent referrals, including:

- symptoms of septic arthritis such as fever, redness, swelling and decreased range of movement of the joint[1]
- signs of acute trauma such as acute pain, inability to weight bear on the affected joint, unstable or wobbly knee, locking of the knee joint and swelling – this may suggest injury to bone, tendons, meniscus or ligaments[1]
- a history of weight loss, fevers and night pain should alert clinicians to possible malignancies and rheumatic arthropathies (eg leukaemia, osteosarcoma and juvenile idiopathic arthritis).[2]

Answer 2

The physical examination consists of checking vital signs. Body mass index is important, as children and adolescents who are obese or overweight are more prone to symptoms of knee pain.[3] It is important to exclude signs of infections, such as osteomyelitis and septic arthritis, by looking for fever, redness, raised local temperature and decreased motion of the joint.[4,5]

Gait can be assessed by looking for a limp or limb length discrepancy.[4] It is vital to examine the hip, as referred pain from the hip can present as knee pain.[3] Clinicians should consider hip conditions that can cause knee pain, such as slipped capital femoral epiphysis, Perthes disease and femoral neck stress fractures.[2]

Palpation of knee landmarks such as tibial and femoral condyles, tibial tuberosity, knee joint line and patella is recommended. It is important to check for effusion in the knee with simple tests such as the patellar tap test and bulge sign. Effusion is usually not present in commonly occurring conditions such as OSD, Sinding-Larsen-Johansson syndrome or patellofemoral pain syndrome.[6] The clinician should follow the general principles of examination of 'look, feel and move' of the knee joint, excluding ligament and meniscal injuries as appropriate.

Answer 3

Common causes of similar knee pain in children and adolescents include the following.[6]

Osgood–Schlatter disease (traction apophysitis at the tibial tubercle)

OSD is an overuse injury due to excessive tension on the patellar tendon at its attachment on the tibial tuberosity. It commonly occurs in adolescent athletes during growth spurts or where there is overload on the area due to biomechanical issues or training errors. If the same condition occurs on the inferior pole of the patella, it is called Sinding-Larsen-Johansson syndrome.[7] There is tenderness over the tibial tuberosity and may be a slight bulge over the tuberosity. OSD is generally considered to be a self-limiting condition, although there is a role for exercise rehabilitation with a physiotherapist or exercise physiologist if it is caused by biomechanical imbalances and relative overuse/overload, and this may reduce the duration and severity of symptoms.[6]

Patellofemoral pain syndrome (chondromalacia patella)

Patellofemoral pain syndrome is commonly found in adolescents, with a prevalence of up to 20%.[8] Anterior knee pain or pain behind the kneecap is brought on by activities such as running and jumping sports or prolonged sitting with flexed knees (theatre sign).[2] A popping, catching or sensation

of the knee giving way may be felt by the patient. Examination may reveal a positive patellar grind test, positive patellar tilt and audible or palpable crepitus on active or passive knee movements.[2]

Iliotibial band syndrome

Iliotibial band syndrome is an overuse injury due to inflammation of the distal iliotibial band as it passes over the lateral femoral condyle and inserts into the tibia.[2] There is pain on the lateral side of knee that is worsened on activities such as climbing stairs, cycling and running. There may be a popping or clicking sensation felt on the outer side of the knee on knee flexion. Patients may feel tenderness over the lateral femoral condyle.[9]

Osteochondritis dissecans

Osteochondritis dissecans is a common childhood problem where a part of the bone detaches or becomes loose and can float in the knee joint. It commonly occurs on the lateral aspect of the medial femoral condyle in the knee joint.[2] Patients may present with vague knee pain; where locking of the knee is evident, there is usually a loose fragment in the knee joint. Examination may be normal.[10] Plain X-ray of the knee is usually sufficient to show the lesion.[11]

Tendinopathies

Pain in the anterior of the knee can be caused by patellar tendonitis. It is commonly called jumper's knee and is seen in basketball players. There is localised pain in the tendon during the activity that is relieved by rest. There is tenderness over the affected tendon. Plain X-rays are normal, and ultrasonography is helpful to confirm the diagnosis.[12]

Infrapatellar fat pad (Hoffa's) syndrome

In this condition, there is irritation or impingement of infrapatellar fat causing burning or aching pain below the kneecap in young active athletes. This area is well innervated.[13] X-rays are normal, and magnetic resonance imaging may show oedema of the fat pad. [14]

Bursitis/stress fracture

Bursitis is uncommon in children and adolescents. Stress fractures of the knee are quite rare.[15]

Answer 4

The most likely diagnosis is traction apophysitis at the tibial tubercle (OSD). It is a very common cause of anterior knee pain in adolescent sportspeople and is more prevalent between the ages of 10 and 15 years. It is usually unilateral but can be bilateral. In the past, it was seen more often in boys, but this has changed because of the increased participation of girls in sporting activities.[16]

OSD is an overuse injury that occurs because of excessive pulling of the patellar tendon on its skeletally immature insertion on tibial epiphysis, resulting in repetitive microtrauma. Excessive pulling of the patellar tendon may also be caused by abnormal biomechanics or errors in technique or training progression. During growth spurts in adolescence, bone grows quicker than tendon, leading to increased tension of the patellar tendon. The insertion point of the patellar tendon on the physis is weak during growth spurts and is at risk of micro avulsion fractures.[16,17] OSD is diagnosed clinically, and imaging is unnecessary unless the diagnosis is uncertain.[2]

Answer 5

To best guide management of OSD, there should be an exploration of the patient's ambitions, training load, how quickly he was increasing his load, his mood state, and whether he was otherwise well or had signs of fatigue, suboptimal nutrition or overtraining.

Management of OSD is summarised as follows:[2,18–21]

- The treatment for OSD is often conservative, and symptoms may persist for up to two years until fusion of growth plates.
- Treatment includes modification of sporting activities, with decreased activities that aggravate pains. Participation in activities should be guided by the level of pain. Complete rest from sports is not recommended. Relative rest, if recommended, should involve flexible load management within the limits of symptoms and should be supervised by a sports doctor or appropriate allied health professional.
- Simple measures such as application of cold packs with ice after activity can help in alleviating pains. A knee brace or strap can be worn during activity for protection and reducing local oedema. Oral nonsteroidal anti-inflammatory drugs can alleviate pain if needed.
- Referral to a physiotherapist or accredited exercise physiologist is recommended for review of Togashi's training load, biomechanical assessment and appropriate rehabilitation exercise, which may include stretching and strengthening exercises of quadriceps and hamstrings and the rest of the kinetic chain, as well as detailed training advice and programming.
- Local steroid injection is not recommended as there is no evidence that it provides relief.
- Surgery for OSD is extremely rare.
- There can be long-term pain in rare cases due to thickened tibial tubercle and a visible knee prominence, but it is usually without any symptoms.
- Reassurance can be provided to parents and carers that OSD is self-limiting and will likely improve as time progresses.
- Good communication with the family and regular follow-up are important to ensure adherence to management plans.

As Togashi is an aspiring athlete, it is critical to patient-centred care to appreciate that two years of relative rest could be career-ending. This case therefore warrants the involvement of a specialised rehabilitation team under guidance of a sports physician, as there may be more that can be done to improve his prognosis.[22,23]

Answer 6

Tibial tubercle fractures typically occur in physically active adolescents who participate in jumping sports. They tend to happen in late adolescence, and may occur as a result of sudden contraction of the quadriceps muscle while initiating a jump or while landing when the knee is flexed to decrease impact.[24] It is suggested that there is an association of this injury with OSD.[24,25]

Patients present with anterior knee pain with swelling due to likely haemarthrosis. Physical examination may show a swollen deformed knee, with a proximally positioned patella. The patellar tendon may not be palpable. Standard knee radiographs are usually sufficient to show this fracture.[24]

Treatment of this condition may include referral to the emergency department for immobilisation, stabilisation or closed reduction as appropriately determined by an orthopaedics team. Clinicians may consider performing a neurovascular assessment of the limb because of the increased risk of compartment syndrome. This is due to disruption of the anterior tibial recurrent artery.[25] Compartment syndrome may lead to different signs in children and adolescents when compared with adults, including increased restlessness, agitation, anxiety and increased requirement for analgesia.[26] The prognosis for patients with these fractures is excellent, with a return to normal sporting activities expected.[24]

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CASE

3 June has a bump on her heel

June, aged 56 years, is an active woman with a long history of bumps on both heels. In the past six months, she has noticed her right heel has become increasingly painful, and she thinks it has enlarged in size. She is now getting a blister over the bump and has had to change her footwear several times.

June's medical history includes type 2 diabetes, which she controls with diet and exercise, but she is otherwise well. She has had plantar fasciitis of both feet in the past.

June does not smoke and consumes 1–2 standard alcoholic beverages per week. She works part time as a sales assistant in a clothes store.

Question 1

What are the possible causes of a painful bump on the heel?

Question 2

What further information would you like to obtain from June in relation to her symptoms?

Further information

You ask June whether she has changed her exercise habits recently. She mentions she has been trying to lose some weight and has been walking up to 10 km per day over hilly terrain. She does not report any history of trauma or infection and says her diabetes is well controlled. Her most recent glycated haemoglobin measurement was 26 mmol/mol (4.5%).

Question 3

What features would you look for on examination?

Further information

You find that the bump is tender to palpation and appears bony in nature.

Question 4

What is the most likely diagnosis?

Question 5

What tests would you order to confirm your diagnosis?

Further information

You order ultrasonography and X-ray of the ankle. The ultrasound shows thickening of the insertion of the Achilles tendon approximately 1–2 cm above the calcaneum. The X-ray demonstrates a Haglund's deformity and calcification within the insertion of the Achilles tendon, also known as a bone spur (Figure 1).

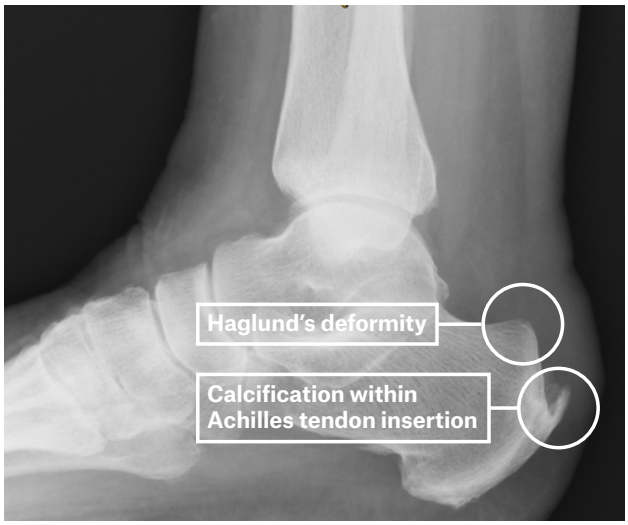

Figure 1. Lateral X-ray of the ankle demonstrating Haglund's deformity and calcification within the Achilles tendon at its insertion into the calcaneum

Question 6

What is a Haglund's deformity and how is it associated with Achilles tendon pathology?

Question 7

How would you manage June's heel pain?

Further information

You suggest a course of anti-inflammatory medication and recommend June avoid walking in hilly areas for the short term. You refer June to an allied health practitioner for a rehabilitation program to address her contracted Achilles tendon.

June comes back to see you after three months with slight improvement, but she is still sore and feels that her rehabilitation has stalled.

Question 8

Where would you refer June now?

Further information

Jane opts for surgery, which proceeds without complication. June presents to you three weeks after her surgery with a tight, painful, swollen calf.

Question 9

How do you manage June now?

Further information

You refer June for urgent doppler ultrasonography of her lower limb, which demonstrates a 20 cm deep vein thrombosis (DVT) in the popliteal vein extending above the knee.

Question 10

What do you do now?

CASE 3 Answers

Answer 1

Possible causes of a painful bump on the heel include:

- insertional Achilles tendinopathy
- Haglund's deformity/retrocalcaneal bursitis
- callus from ill-fitting footwear
- fracture malunion
- scarring from previous surgery
- Charcot arthropathy
- ganglion
- Sever's disease (in younger populations, commonly aged 5–10 years)
- inflammatory arthritis (eg rheumatoid arthritis, gout); Achilles tendinopathy associated with an inflammatory arthropathy
- xanthoma
- benign or malignant bone tumour (eg sarcoma) – rarely.

Answer 2

Further information to elicit from June could include the following:

- her level of physical activity, hobbies and change or increase in exercise habits (load)
- change in work duties (sales assistant – more hours/time on feet, more time on ladders with stocktake etc)
- change in footwear or training surface (walking more hills, harder surfaces)
- interventions attempted to date (eg podiatry or physiotherapy, including any exercises that have been prescribed, as excessive eccentric loading below neutral is good for the mid portion but may be exacerbating insertional tendinopathy with more compression)
- any history of trauma or surgery to the heel
- any history of infection
- degree of diabetes control – involvement of other bodily systems (eg history of retinopathy, nephropathy or peripheral neuropathy)
- previous history of Charcot arthropathy or diabetic foot ulcers
- history of rheumatological or autoimmune conditions, including involvement of pathology in hands, eyes or dermatological changes
- body mass index.

Questionnaires that can be used to assess patients presenting with heel pain include the Victorian Institute of Sport Assessment – Achilles (VISA-A)[1] questionnaire and the Manchester–Oxford Foot Questionnaire (MOXFQ).[2]

Answer 3

Features to look for on examination follow.

Inspection

- Presence of swelling, ulcers, skin changes, scars or infection over the bump
- Evidence of padding at the back of the shoe that may suggest the bump is painful
- General inspection of foot – pronated foot, arches (pes planus or cavus – although correlation is debatable), calf wasting

Palpation

- Size, density and borders of the bump
- Any defects or thickening to the bump or Achilles tendon
- Crepitus to ankle or subtalar joint
- Tenderness to palpation over the bump and at the Achilles tendon – and specifically whether there is tenderness in the

midsubstance of the Achilles or at the Achilles insertion, and whether there is swelling and/or tenderness deep to the Achilles

Movement

It is important to assess gait, balance, pelvic and lower limb biomechanics to look for antalgia or toe-walking. The practitioner should assess range of motion of the ankle and determine if an Achilles tendon contracture is present, and assess for pain on range of motion of ankle and subtalar joint.[3] It is also important to determine whether pain is exacerbated by dorsiflexion (suggesting the Achilles tendon is irritated).

Special tests

The general practitioner can perform the squeeze test to test tendon integrity.

It is important to assess the neurovascular status of the lower limb, with careful assessment of dorsalis pedis pulse and presence/absence of sensation to:

- tibial nerve S1/2 – heel
- sural nerve S1/2 – lateral heel
- saphenous nerve L3/4 – medial arch
- medial plantar nerve L4/5 – medial plantar foot including medial three toes
- lateral plantar nerve S1/2 – lateral plantar foot including lateral two toes.

Answer 4

June most likely has insertional Achilles tendinopathy of her right Achilles tendon.

Answer 5

If there are any symptoms suggesting a systemic inflammatory condition such as rheumatoid arthritis, then a blood test to check inflammatory markers and autoantibodies is indicated.

Ultrasonography would be useful to determine the integrity of the Achilles tendon. Although operator dependent, ultrasonography correlates well with histopathological findings. An ultrasound may show thickening and rounding of the affected part of the tendon as well as evidence of neovascularisation and possible small intrasubstance tears.

A lateral X-ray of the ankle would demonstrate calcification within the insertion of the Achilles tendon as well as the presence of a Haglund's deformity.

Magnetic resonance imaging is not indicated as a first-line investigation but may be useful if ultrasonography and X-rays are inconclusive, or if there is no response to conventional treatment.[4]

Answer 6

First described by Patrick Haglund in 1927, the Haglund's deformity is also known as a retrocalcaneal exostosis and 'pump bump'.[5] It is thought to cause heel pain by mechanical impingement of the retrocalcaneal bursa.[6] A Haglund's deformity is very common and often present in asymptomatic patients, and insertional Achilles tendinopathy is commonly present with a Haglund's deformity.[6]

Answer 7

This condition should initially be treated nonoperatively. First, June should initially avoid the activity that exacerbated the pain (in this instance long walks and hill climbing). Trialling a course of anti-inflammatory medication may be helpful. A simple 5 mm heel lift in the shoe, available from pharmacies, or wearing shoes with a low heel shortens the working length of the Achilles tendon and can help alleviate symptoms.

A referral to a sports podiatrist, physiotherapist or exercise physiologist is warranted. Avoidance of shoes with a hard heel cup may help, and a podiatrist may be able to offload the bump with some padding techniques. Physiotherapy can address the tight heel cord and posterior chain, then start a strengthening program once the acute inflammation settles.[7]

Answer 8

Three months of nonoperative management is recommended. Should the patient still be symptomatic after that time, specialist referral is warranted. June may benefit from the opinion of a sports and exercise physician before considering surgical management. A sports physician may be able to discuss the risks and benefits of steroid injections in detail and comprehensively address June's activity levels and other injuries such as hip or knee arthritis that may be limiting her recovery. A steroid injection in and around the insertion of the Achilles tendon and its paratenon has a 1% risk of rupture of the tendon.[8] It is recommended that steroid injections for this condition are avoided where possible; if referred, patients should be carefully counselled about the risk of the procedure.

A sports and exercise physician may be able to discuss other treatment modalities. There is limited evidence to support extra-corporeal shockwave therapy for insertional Achilles tendinopathy.[9] This can be extremely painful for some patients and is by no means universally successful, but shockwave therapy is unlikely to cause harm provided the patient is not taking anticoagulants and there are no other risk factors for the treatment.

Topical treatments may include xylocaine patches or anti-inflammatory creams. The use of both nonsteroidal anti-inflammatory drugs and neuropathic medication in a cream prepared by a compounding pharmacy may be particularly helpful. Iontophoresis is a transdermal drug delivery system used to administer low-dose dexamethasone to the periosteal, paratenon, fat pad and other soft tissues, often with good relief. Platelet-rich plasma injections are sometimes used to treat intrasubstance or partial tears of the insertional tendon but must be performed with adequate periods of offloading in a controlled ankle motion (CAM) boot with protected weight bearing. Glyceryl trinitrate patches can be cut into quarters (1.25 mg) to treat the pain and help heal tendinopathy in the

elbow and mid-portion Achilles.[10] These can sometimes be helpful when significant insertional tendinopathy is present.

Surgery may be indicated, and referral to an orthopaedic surgeon with an interest in conditions of the foot and ankle would be of benefit. Surgery involves debridement of the Achilles tendon followed by excision of the Haglund's deformity and retrocalcaneal bursa. This procedure has good surgical results, with over 90% of patients reporting good or excellent outcomes following surgery,[11] but it does involve a two-week period of limited or non-weight bearing, followed by a 6–12-week period in a CAM boot or other immobilisation device. Complete recovery takes between three and six months following surgery, and risks associated with the procedure can include infection, DVT/pulmonary embolism, injury to the sural nerve and incomplete excision of the deformity.

Answer 9

June is at high risk for a DVT. Achilles tendon conditions and surgery predispose patients to clotting due to immobilisation of the gastrocsoleus pump and subsequent venous stasis in the deep veins of the lower limb. June needs to undergo urgent lower extremity duplex ultrasonography and same-day review to discuss the results. This may be available through a local radiology provider or emergency department.

If an urgent lower extremity duplex ultrasonography is unavailable on the same day, June should be commenced on chemoprophylaxis until ultrasonography results are available.

It is also worthwhile communicating urgently with the surgeon about June's possible complication with a suspected DVT and commencement of anticoagulant medication.

Answer 10

June should be commenced on anticoagulant medication for three months due to the diagnosis of a proximal, provoked DVT as per new guidelines from the Thrombosis and Haemostasis Society of Australia and New Zealand for the diagnosis and management of venous thromboembolism.[12]

Anticoagulant options include:

- apixaban – 10 mg orally twice daily for seven days, reducing to 5 mg orally twice daily for the remainder of the three-month period
- rivaroxaban – 15 mg orally twice daily for 21 days then decrease to 20 mg daily
- dabigatran – start a parenteral anticoagulant such as low molecular weight heparin (LMWH) for five days
- warfarin – start a parenteral anticoagulant and warfarin simultaneously. Continue LMWH for a minimum of five days and until the international normalised ratio (INR) has reached ≥2.0 on two consecutive days, then stop the parenteral anticoagulant and continue warfarin alone. Adjust warfarin dose to target INR 2.0–3.0.

LMWH options include:

- dalteparin – 200 units/kg subcutaneously once daily or 100 units/kg twice daily
- enoxaparin
  - creatinine clearance (CrCl) ≥30 mL/min: 1.5 mg/kg subcutaneously once daily or 1 mg/kg twice daily
  - CrCl ≤30 mL/min: 1 mg/kg subcutaneously once daily.

Conclusion

June commences anticoagulant medication according to the guidelines. She undergoes repeat lower limb duplex ultrasonography three months later, which confirms complete eradication of the blood clot.

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ACTIVITY ID 292357

Sports medicine

This unit of *check* is approved for six CPD Activity points in the RACGP CPD Program. The expected time to complete this activity is three hours and consists of:

- reading and completing the questions for each case study
  - you can do this on hard copy or by logging on to the RACGP website (www.racgp.org.au), clicking on the My Account button and selecting the *gplearning* link from the drop-down
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  - you must score ≥80% before you can mark the activity as 'Complete'
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Case 1 – Hari

Hari, aged 12 years, presents with right knee pains for the past two months. His knee pain occurs intermittently, brought on by sporting activity and relieved at rest. Hari is a runner and participates in sprint competitions. You examine Hari and find no red flags of knee pain. Your examination findings suggest Osgood-Schlatter disease (OSD).

Question 1

Which one of the following statements about OSD is **true**?

A. The condition usually resolves completely in two years upon closure of physis.

B. The condition becomes chronic in 30% of cases.

C. X-rays of the knee assist early diagnosis and treatment.

D. Patients with the condition commonly switch to lower-intensity sports over time.

Question 2

Which one of the following is the most suitable initial management in this case?

A. A short period of complete rest for four weeks and then gradually resume usual sports

B. Continue the same level of activity with analgesia as required

C. Relative rest with sporting activity guided by the level of pain

D. Corticosteroid injection to significantly improve symptoms

Further information

With approriate management, Hari's condition improves and he returns to competitive sprinting. At the start of a sprint during a training session, Hari feels sudden pain in his right knee and is unable to weight bear afterwards on the affected knee. His knee becomes grossly swollen, and movements are not possible because of pain. You refer him for initial plain X-rays of the knee, which show patellar tendon avulsion fracture of the tibial tubercle.

Question 3

Which one of the following is a common and serious complication of this injury?

A. Non-union of fracture

B. Compartment syndrome

C. Post-trauma deep vein thrombosis of the calf

D. Stunted growth of bone in adolescents

Case 2 – Jacquie

Jacquie, aged 54 years, presents to you with pain and a large bump on the back of her heel that intermittently becomes blistered.

Question 4

Which one of the following is the most likely diagnosis?

A. Soft tissue sarcoma

B. Osteoarthritis

C. Insertional Achilles tendinopathy

D. Plantar fasciitis

Question 5

Which one of the following is the most appropriate primary imaging modality for suspected pathology of the Achilles tendon?

A. Computed tomography

B. Ultrasonography

C. Magnetic resonance imaging

D. Nuclear medicine scan (bone scan)

Question 6

Which one of the following would **not** be a recommended management option for Jacquie's condition?

A. Prescription of anti-inflammatory medication

B. Referral to a sports podiatrist

C. Wearing flat shoes such as thongs or canvas runners

D. Avoiding shoes with a hard heel cup

Further information

Jacquie's condition continues to deteriorate, and you consider referring her for surgical management.

Question 7

Which one of the following is the recommended time to trial nonoperative management for insertional Achilles tendinopathy before non–general practitioner specialist referral?

A. Three months

B. Six months

C. Nine months

D. 12 months

Case 3 – Ming

Ming, aged 25 years, is a truck driver who plays reserve grade AFL football. He comes to see you for a clearance to play in tomorrow's grand final following a diagnosed sports-related concussion (SRC) 10 days prior. You take a history and examine Ming and, as part of your assessment, undertake a symptom evaluation as per step 2 on page 3 of the Sport Concussion Assessment Tool – 5th Edition (SCAT5).

Your evaluation reveals Ming's symptoms have dramatically improved. The total number of symptoms he had initially was 19, and this has now decreased to three (dizziness, pressure in head and balance problems). His symptom severity score has also significantly decreased from 98 to eight.

Question 8

Which one of the following describes how you would respond to Ming's request to play football?

A. Given the marked improvement in symptoms and severity, Ming is cleared to play this weekend.

B. As Ming still has some mild symptoms, he should only play two quarters of the game.

C. Ming cannot be cleared to return to sport until completely symptom free.

D. A maximum of two symptoms only are allowed before clearance to play may be given.

Further information

Ming agrees to further rehabilitation before returning to football.

Question 9

When following the SCAT5, in general, how long should each step of the rehabilitation strategy take to complete?

A. One day

B. Two days

C. One week

D. As long as required

Further information

Ming returns for review four weeks post SRC. He is still experiencing symptoms and has not been able to return to driving his truck as he is still experiencing moderate dizziness.

Question 10

Which one of the following would be your recommendation at this stage?

A. If at six weeks post concussion he is still experiencing symptoms, referral for a neurosurgical opinion is indicated.

B. Ming should not drive heavy vehicles for another two weeks and be reviewed weekly.

C. Mild ongoing symptoms at four weeks post-concussion are not uncommon and may be managed with medication such as prochlorperazine if indicated.

D. Ming should be referred to a specialist skilled in assessing and managing concussion as soon as possible.

check

Independent learning program for GPs