FACT SHEET — SPINAL — MECHANICAL

Spondylolysis

A stress fracture of the spine — commonly missed in young athletes and active adolescents

Spondylolysis is a stress fracture or defect in a small bony bridge in the vertebra called the pars interarticularis — the section connecting the upper and lower joint surfaces at the back of the vertebra. It is one of the most commonly missed causes of back pain in young people, frequently dismissed as a muscle strain for months or even years before the correct diagnosis is made.

Why it matters

Spondylolysis is not dangerous in most cases but it significantly affects management. A young athlete with an undiagnosed pars stress fracture who continues high-loading activity risks progressing to a complete fracture and potentially spondylolisthesis (vertebral slippage). Early correct diagnosis changes the outcome significantly.

Who gets it

Spondylolysis occurs in approximately 6% of the general population but is substantially more common in certain athletic groups. The pars interarticularis is vulnerable to repeated hyperextension and rotational loading — the same movements that define many sports.

Fast bowlers (cricket)	The highest reported incidence of any sport. Side-on delivery action combines hyperextension with rotation at speed. Elite fast bowlers have rates of 30–55%.
Gymnasts	Repeated back walkovers, bridges, and landing positions load the pars relentlessly. One of the most common causes of back pain in young gymnasts.
Rowers	Repeated flexion and extension under load. The catch position is particularly demanding on the pars.
Footballers	Repeated kicking actions, particularly with the non-dominant leg, create rotational stress.
Weightlifters	Heavy overhead and squatting movements in hyperextension load the pars significantly.
Dancers	Arabesque and other hyperextension positions particularly in classical ballet.
General adolescents	Adolescent growth spurts create a period of relative vulnerability even without sport. New back pain in an adolescent should always be investigated.

Symptoms and how to recognise it

The challenge with spondylolysis is that its symptoms are non-specific — it presents very similarly to a muscle strain. The key distinguishing features are:

- **Lower back pain in a young, active person** — particularly those in high-risk sports

- **Pain with extension** — leaning back significantly aggravates symptoms (the single most useful clinical sign)
- **One-leg extension test** — standing on one leg and leaning back reproduces pain on the affected side
- **Not improving with rest as expected** — typical muscle strains settle; pars injuries often plateau
- **No leg pain or neurological symptoms** in most cases
- **Often bilateral** (both sides affected), particularly in gymnasts and fast bowlers

The diagnostic challenge — why it gets missed

Standard X-rays miss spondylolysis in up to 30% of cases. The classic oblique X-ray view shows the famous "Scottie dog" sign — a collar around the dog's neck indicating the pars defect — but even this is not reliably sensitive. MRI is now the preferred investigation as it can show bone oedema (stress reaction) before a frank fracture develops, allowing intervention at the earliest stage. A CT scan provides the most detailed view of an established fracture.

Stages and what they mean

Stage	What it means
Stress reaction (early)	Bone oedema without a visible fracture line. Detected on MRI only. The most treatable stage — appropriate rest and activity modification at this stage can prevent progression to fracture.
Stress fracture (established)	A visible fracture line in the pars. The majority of cases. Most heal with conservative management over 3–6 months.
Non-union / chronic defect	The fracture has not healed and a fibrous union has formed instead. Often asymptomatic in adults who have had the defect since adolescence. Managed conservatively in most cases.
Progression to spondylolisthesis	Bilateral spondylolysis can allow the vertebra to slip forward (spondylolisthesis). This represents a change in structural stability and requires different management.

Treatment and return to sport

Activity modification	The cornerstone of treatment. Reducing or stopping the loading activity while the bone heals. For most young athletes this means a period of 6–12 weeks away from the aggravating activity.
Bracing	A rigid or semi-rigid brace may be recommended to reduce extension loading while the pars heals, particularly in the early stages. Evidence is mixed but it is commonly used.
Physiotherapy / rehabilitation	Core stability, gluteal strengthening, and hip flexor flexibility reduce the loading demands on the pars. This is the active component of recovery and continues through return to sport.

Return to sport protocol	Gradual, structured return guided by symptom response and ideally imaging confirmation of healing. Returning too early risks non-union or progression.
Surgery	Rarely required. Direct pars repair (Buck's procedure) or spinal fusion may be considered for persistent pain in high-level athletes who have failed conservative management over 12–24 months.

Related fact sheets

Spondylolisthesis	The condition that can develop from bilateral spondylolysis — vertebral slippage.
Back pain in adolescents and young adults	The broader context of back pain in young people and why it is different from adult presentations.
Lumbar instability	How structural changes affect spinal stability and function.
Pilates and yoga for back pain	Core stability as the foundation of long-term spinal health.

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