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Review article

The management of sternoclavicular instability☆

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ABSTRACT

Sternoclavicular joint (SCJ) instability is a rare condition that has myriad of presentations ranging from acute dislocation to chronic instability and may have severe consequences for the patient if it is missed. This article outlines the clinical presentations, investigations and the principles behind the available treatment options that can ensure a safe return to a normally functioning shoulder. Instability of the SCJ may happen after a traumatic event or atraumatically with or without joint laxity. The clinician should promptly differentiate the two pathomechanisms as management of them differs significantly. The Stanmore instability triangle is a useful tool when assessing patients with chronic SCJ instability as it enables the clinician to recognise the factors that drive the instability and treat each component separately and in a staged manner.

Treatment is dependent on understanding the various factors including the direction of instability, chronicity and pathomechanisms. This could involve conservative management with resting the arm in a sling followed by targeted physiotherapy or surgical management with closed or open reduction and if required, surgical stabilisation with autograft, suture anchors or plating.

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Contents

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1. Introduction

The SCJ is a unique joint that plays a pivotal role in force transmission and smooth scapulothoracic motion during shoulder elevation and is formed by the clavicle which is perched over the top of the sternum and medial end of the first rib. It is stabilised mainly by the strong extrinsic ligaments and a dynamic muscular envelope. It is one of the overlooked joints due to paucity of informed literature on the subject, difficulty in diagnosis, limitations of standard radiography, unfamiliar anatomy and complex biomechanics.[1] The aim of this article is to outline the salient points that an orthopaedic clinician must be aware of when faced with injuries or instability around the SCJ, so that the diagnosis is not missed which thereafter may lead to morbidity.

2. Anatomy

The SCJ is a synovial plane joint formed by the sternal end of the clavicle, the upper lateral part of the manubrium, and in 25% of people, the cartilage of the first rib. Less than half of the joint surface of the medial clavicle articulates with the sternum. The ligaments of this joint include the anterior and posterior sternoclavicular, costoclavicular (between the first rib and the medial clavicle, also known as rhomboid) and interclavicular ligaments (Fig. 1). The intra-articular disc is a flat and nearly circular fibrocartilage, interposed between the articulating surfaces of the clavicle and sternum and attached posteromedially to anterolaterally. It divides the joint into two cavities, each of which is lined by a synovial membrane. This articulation is the only synovial joint between the upper limb and the chest wall. During scapulothoracic motion, the majority of movement is transmitted through the clavicle into the SCJ. This allows motion in nearly every direction, up and down (lateral compartment), forwards and backwards (medial compartment) as well as circumduction. The clavicle elevates 4° for every 10° of arm elevation through the first 90° of forward elevation.[2] The medial clavicle and the intra-articular cartilage glide on the articular surface of the sternum during this motion. Combined movements require rotation, and the clavicle may rotate by as much as 40° along its longitudinal axis.[3]

The SCJ is an inherently unstable joint; however, its main stabilisers include strong extrinsic ligaments and to a lesser extent a dynamic muscular envelope. The important ligaments for stability are thought to be the anterior and posterior sternoclavicular ligaments.[4,5] The anterior is about 50% weaker than the posterior.[6] Rupture of the intra-articular disc could also cause instability5 in young adults. The aponeurotic insertion of the superficial part of the clavicular insertion of the sternocleidomastoid (SCM) is contiguous with the more direct insertion of the clavicular and sternal parts of pectoralis major (PM) below. The subclavius muscle has a tendinous origin from the first rib immediately lateral to the costoclavicular ligament and has a long direct insertion onto the inferior surface of the clavicle. It acts to reduce the rate and range of upward displacement of the clavicle when under lateral compressive loads on the shoulder. Behind the SCJ's lies the thoracic inlet, containing the great vessels of the superior mediastinum, followed by the trachea, oesophagus, vagus and phrenic nerves behind the sternohyoid and sternothyroid muscles (Fig. 2). It should be noted that the medial epiphysis of the clavicle only starts ossifying at 18–20 years of age and doesn't close until 23–25 years of age. Medial clavicle physeal fractures in young adults can therefore be difficult to differentiate from SCJ dislocations.

3. Epidemiology

Traumatic dislocations of the SCJ comprise 1% of all joint dislocations and 3% of those in the upper limb.[7] It is far more common in active, young males who are involved in sporting injuries, road traffic accidents and fall from a height which results in a high-energy mechanism of injury.[8] A direct blow to the medial aspect of the clavicle can cause a posterior dislocation of the SCJ but more commonly these are indirect injuries due to a compressive force applied to the lateral aspect of shoulder girdle.

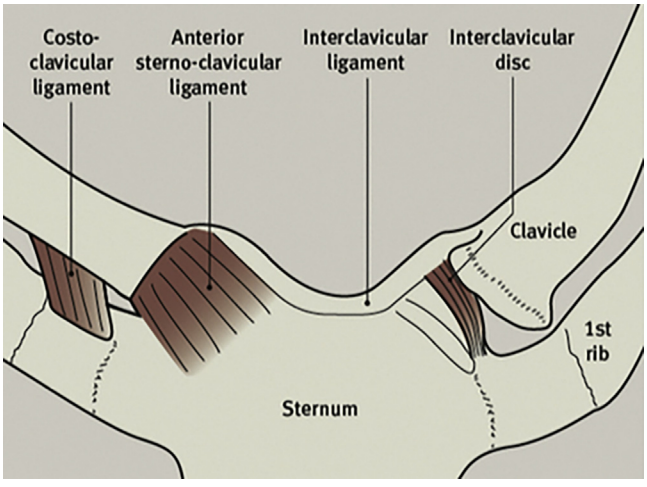

Fig. 1. The anatomy of the sternoclavicular joint.

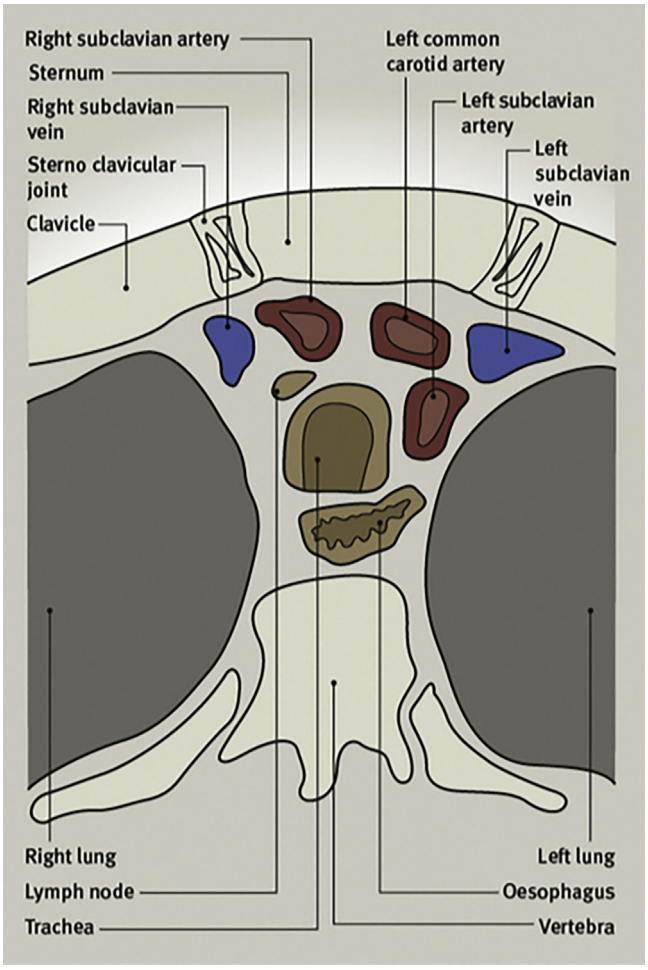

Fig. 2. Cross section of the thorax at the level of the sternoclavicular joint showing the structures immediately posterior to the joint.

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