

Midcarpal Instability

The Role of Wrist Arthroscopy



Ryan P.C. Higgin, BM, BMedSci, MRCS (Eng), David G. Hargreaves, MBBS, FRCS (Tr & Orth)*

KEYWORDS

• Wrist arthroscopy • Midcarpal instability • Capsular shrinkage • Diagnosis • Treatment

KEY POINTS

- Diagnosis of midcarpal instability (MCI) is difficult and requires knowledge of the anterior midcarpal drawer test.
- Lack of proprioception is a factor in palmar MCI.
- Soft tissue reconstructions have failed in the past due to a tendency to stretch over time.
- Arthroscopy for MCI has a role for patients with mild dynamic symptoms.
- Partial wrist fusion will stabilize the carpus and is appropriate for patients with deformity or recurrent symptoms.

INTRODUCTION

There is poor consensus among surgeons in how to best treat patients with midcarpal instability (MCI). This is due to the lack of clarity concerning the initiating pathologic condition, the confusing nomenclature that has evolved over the last few decades, the lack of clear diagnostic investigations, the lack of evidence of the natural history of the condition, and the lack of evidence of comparative treatment options. The reason for this is the relative paucity of cases requiring treatment. For many years, surgeons failed to diagnose the condition correctly and opted for nonoperative treatments.

MCI is a condition that continues to be an area of significant controversy. In carpal instability, the concept of discreet anatomic abnormalities that cause pathologic pathways is well known. In MCI, the anatomy is often normal, but there is a dysfunction of the proprioception and subsequent biofeedback mechanisms that normally stabilize the wrist.

MCI is typically classified as being a nondisso-ciative carpal instability. It is, therefore, presumed

that there is instability between the carpal rows rather than within a row. The name suggests that it is the midcarpal (MC) joint that is the cause of the problem. Actually, it is both the MC and the radiocarpal (RC) joints that are functioning abnormally, causing a lack of normal control of the proximal carpal row. The dysfunction and instability typically occurs when the wrist is under load and pronated.

Although it is conventionally understood that joints become stiff with age, it may take decades before patients with MCI become stiff enough to be considered stable and asymptomatic. Many surgeons have previously considered that this is, therefore, a condition that does not require treatment. The literature does not contain any specific longitudinal studies on the natural history of MCI. There is evidence to suggest that patients may present with symptoms that have been present for as long as 10 years.¹ Some patients can start to become symptomatic in middle age instead of early adulthood, as is typically encountered.¹ There is no evidence to suggest that chronicity of MCI causes degenerative change.

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Department of Orthopaedics, University Hospital Southampton, Tremona Road, Southampton, SO16 6YD, UK

* Corresponding author.

E-mail address: DGHarg@aol.com

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TYPES OF MIDCARPAL INSTABILITY

Despite MCI, and the so-called snapping wrist, being initially recognized in the literature in 1934, the concept of MCI as a recognized pathologic condition of the wrist was not fully accepted until the 1980s when Lichtman and other authors published work on the topic.²⁻⁶ Originally describing and coining the term ulnar MCI, Lichtman was the first to publish a case series of subjects presenting the now typical MC clunk and pain when the wrist is ulnarly deviated while in pronation² and Johnson recognized that the MC subluxation could present in either a palmar or dorsal pattern.^{3,4} The term ulnar MCI was then dropped in preference for palmar and dorsal, formally recognizing these patterns.⁶ MCI now has 3 distinct subgroups caused by intrinsic ligamentous laxity: palmar, dorsal, and combined.

Palmar

Palmar MCI (PMCI) is by far the most common presentation of MCI. It is usually an intermittent palmar tilting of the proximal carpal row that occurs during the normal transition of wrist motion (from radial to ulnar deviation). Patients may occasionally have a static deformity, with a volar intercalated segmental instability (VISI) wrist deformity visible on a lateral radiograph. More recently, there has been a consensus that PMCI can predominate on either the radial or ulnar side of the wrist. Caputo and Watson have classified PMCI into 4 types.^{7,8} Types 1 and 2 are ulnar based, and types 3 and 4 radial based.

Types 1 and 2 (ulnar)

It is currently understood that general laxity associated with some possible minor predisposing trauma leads to hypermobility of the proximal carpal row and the typical palmar sag.⁹ Several studies have provided in vitro evidence to suggest the involvement of dorsal radiocapitate and palmar ulnar arcuate ligaments.^{2,3,10}

This laxity allows abnormal kinematics when the wrist is moved from radial to ulnar deviation, and the patient can experience a typically painful clunk as the proximal carpal row moves from flexion to extension as the wrist is moving ulnarward. This sudden pain and clunk is colloquially referred to as a catch-up clunk.

Types 3 and 4 (radial)

Types 3 and 4 are much less common types of PMCI. They both involve rotation of the scaphoid. In type 3, there is laxity at the

scapho-trapezio-trapezoid (STT) joint ligaments with the scapholunate ligament remaining intact. Type 4 involves rotatory subluxation due to scapholunate ligament disruption. Lichtman and Wroten⁶ more recently suggested that historical failures of some surgically managed cases of PMCI may well be due to the lack of understanding of types 1 to 4 of PMCI, and their differing causes.

Dorsal

Dorsal MCI develops when there is ligamentous laxity that results in a dorsal subluxation at the MC joint. In capitulate instability pattern (CLIP), Louis and colleagues³ proposed that dynamic laxity of both the volar radiolunate and dorsal capitulate ligament complex can lead to dorsal MCI. This was diagnosed by applying pressure on the scaphoid tuberosity with longitudinal traction and flexion of the wrist. Positive cases had fluoroscopic evidence of the dorsally subluxated proximal carpal row in addition to the capitate subluxating dorsally on the lunate.^{3,10} In 1986, chronic capitulate instability was described by Johnson and Carrera.⁴ They documented normal carpal alignment aside from a patient with a static dorsal intercalated segmental collapse. Clinical diagnosis was made when pressure was placed on the capitate in a dorsal direction. Subjects became apprehensive and described a painful clunk as the lunate abruptly moved dorsally and ulnarly but then realigned itself. It was considered that trauma and laxity to the palmar radiocapitate ligament was the primary cause of this condition. Both these conditions are similar and, therefore, usefully termed as a single entity.

Combined

As the name suggests, patients with combined MCI have both palmar and dorsal subluxations. The subluxation can be seen at either RC or MC joints.¹¹ Combined MCI is a rare presentation and there is little evidence-based research or series specifically on this topic. It probably only occurs in the hyperlax individual, such as with Ehlers-Danlos syndrome.¹²

GRADING OF PALMAR MIDCARPAL INSTABILITY

Lichtman described a classification system based on the amount of palmar MC translation and whether this was under voluntary control. This system was at risk of poor interobserver correlation and did not include subjects with a static deformity. Hargreaves¹¹ has recently suggested a

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