Definition and Classification of Carpal Instability

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1 Introduction

Although the study of the different types of carpal instability goes back to 1905 with Destot's [1] publication, the word "instability" itself was first used in 1967 [2]. In 1972, Linscheid et al. came up with the first classification of the different types of wrist instability, among which are the notions of dorsal flexion and palmar flexion instability [3]. But the definition, in order to be complete, had to be revised several times. The classification of these lesions requires the analysis of many criteria.

2 Definition

In a way, a wrist may be considered as unstable if there is a malalignment of the carpal bones [4]. But this description is limited in the sense that certain hyperlax wrists present a carpal malalignment without being symptomatic and that some radiographically normal wrists are symptomatic and cannot bear loads [5]. Therefore, the definition of instability cannot be restricted to a loss of alignment of the carpal bones visible on plain X-rays. Instability could be defined as the inability of the wrist to transmit physiologic loads. But this definition does not render the "snapping" phenomena which certain patients sometimes feel while grasping. The IFSSH wished to clarify this definition published in 1999 [5]. A wrist is considered to be unstable "when it is not capable of bearing loads without sudden changes of cartilaginous pressure or when its kinematics is perturbed, including brutal changes in the alignment of the carpal bones."

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3 Classification

In fact, instability can be classified according to different criteria brought together in 1995 by Larsen et al. [6, 7]. In this way, six categories appear; these may be combined in order to add more precision to the description.

I Chronicity

(a) Acute (<1 week; maximum healing potential)
(b) Subacute (1–6 weeks; healing potential)
(c) Chronic (>6 weeks; little healing potential)

II Variability

(a) Static, visible on standard pictures (reducible or irreducible)
(b) Dynamic, visible on stress or fluoroscopic radiographies
(c) Predynamic, or occult [8], invisible on radiographies but visible in arthroscopy

III Etiology

(a) Congenital
(b) Traumatic
(c) Inflammatory
(d) Arthritis
(e) Osteonecrosis (Kienböck's disease, necrosis of the capitate)
(f) Neurological
(g) Iatrogenic

IV Location

(a) Radiocarpal
(b) Intercarpal
(c) Midcarpal
(d) Carpometacarpal
(e) Particular bones or ligaments

V Direction of the Instability

(a) VISI
(b) DISI
(c) Ulnar
(d) Radial
(e) Volar
(f) Dorsal
(g) Proximal
(h) Distal
(i) Rotatory
(j) Combined

VI Types

(a) Carpal instability dissociative (CID): intra-row instability, proximal most of the time, if not, distal
(b) Carpal instability nondissociative (CIND): inter-row instability, generally visible through a shift of the first row, can be of radiocarpal or midcarpal origin
(c) Carpal instability combined or complex (CIC): association of an intra-row (CID) and inter-row [5] (CIND) instability
(d) Carpal instability adaptive (CIA): of extracarpal origin, most of the time due to the adaptation of the carpus to a vicious callus of the radius

These type descriptions were detailed in "Terminology and Definitions" works of the IWIW (International Wrist Investigators' Workshop), published in 2002 [9].

4 Discussion

None of these classification categories is sufficient to give an idea of the variety of different types of instability, of circumstances in which these may appear, of diagnostics, of possible evolutions and of treatments. The cross-checking of these classifications also enables one to understand that several evolutive or lesional aspects may correspond to a similar clinical or radiographic aspect. Finally, a normal use of these classification systems leads to answering various questions.

The aim is to help the practitioner select the most suitable treatment. Certain categories (I, II, VI) contain exclusive choice possibilities, with only one possible item being retained. In categories III, IV, and V, several items may simultaneously correspond to the lesional description [6, 7]. Finally, even if all the descriptive categories are useful to the therapeutic discussion, categories I, II, III, and VI have specific implications in the evaluation of the lesion, and categories III, IV, and V have specific implications in envisaging the therapeutic options.

5 Conclusion

Thanks to these works of clarification and lesional description, the practitioner now has at his/her disposal a tool enabling a theoretical analysis of the situation. It is all about a language in the process of becoming adopted by all which will enable one to better compare populations and treatments. Of course, for each clinical case, one still has to put to good use the diagnostic tools necessary to answer in the best way possible the different questions brought to light by this classification.

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