



Workplace Safety and Insurance
Appeals Tribunal

Tribunal d'appel de la sécurité professionnelle
et de l'assurance contre les accidents du travail

Double Crush Syndrome

Discussion paper prepared for

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Dr. J.F. Ross Fleming graduated from the University of Toronto Medical School in 1947. He did post-graduate training in neurosurgery at the University of Toronto, at the University of Michigan and at Oxford, England, from 1947 to 1956. He became a Fellow in neurosurgery in 1956. He holds the rank of Professor Emeritus in the Division of Neurosurgery, Department of Surgery, at the University of Toronto. His clinical and research interests were in neurosurgery. He has published widely in that area. He practiced at the Toronto Western Hospital as the Head of the Division of Neurosurgery from 1965 to 1984 and as staff in the Division of Neurosurgery from 1956 to 1996. Dr. Fleming was involved at the Tribunal as an assessor from 1988 to 1992, as a counsellor from 1993 to 1997 and as Chair of the medical counsellors group from 1998 to 2006.

WSIAT literature search reviewed by Dr. D. Rowed in 2011, who is of the opinion that this paper still provides a balanced overview of the medical knowledge in this area.

This medical discussion paper will be useful to those seeking general information about the medical issue involved. It is intended to provide a broad and general overview of a medical topic that is frequently considered in Tribunal appeals.

Each medical discussion paper is written by a recognized expert in the field, who has been recommended by the Tribunal's medical counsellors. Each author is asked to present a balanced view of the current medical knowledge on the topic. Discussion papers are not peer reviewed. They are written to be understood by lay individuals.

Discussion papers do not necessarily represent the views of the Tribunal. A vice-chair or panel may consider and rely on the medical information provided in the discussion paper, but the Tribunal is not bound by an opinion expressed in a discussion paper in any particular case. Every Tribunal decision must be based on the facts of the particular appeal. Tribunal adjudicators recognize that it is always open to the parties to an appeal to rely on or to distinguish a medical discussion paper, and to challenge it with alternative evidence: see *Kamara v. Ontario (Workplace Safety and Insurance Appeals Tribunal)* [2009] O.J. No. 2080 (Ont Div Court).

DOUBLE CRUSH SYNDROME

Conduction of impulses along a nerve is impaired if the nerve is sufficiently compressed at a specific location along the course of the nerve. Slowed conduction and/or decreased amplitude of the impulse result in weakness and wasting of muscles supplied by the nerve, and decreased sensation in the area of skin supplied by the nerve. If the degree of compression is minimal, there may be no clinical evidence of impaired conduction, i.e. no muscle weakness or wasting, and no sensory loss. The “double crush” theory proposes that if a nerve is compressed at two separate places along the course of a nerve, often at a considerable distance from each other, even though the degree of compression at one or both sites is insufficient to cause any symptoms (i.e. sub-clinical), the impairment of conduction caused by the double compression is cumulative and is sufficient to cause symptoms such as motor or sensory impairment.

Examples of the double crush syndrome might be TOS plus CTS, or cervical nerve root compression plus CTS. A diagnosis of double crush syndrome could only be made if it is the very same nerve fibres that are compressed at the two sites, (for example median nerve fibres in the carpal tunnel and the very same fibres in the portion of the brachial plexus or cervical nerve root through which they travel), so that very strict neuro-anatomical accuracy must be applied. Also, it must be remembered that the clinical manifestation of double crush is due to impaired nerve conduction, and consists of neurological deficit such as muscle weakness or wasting or sensory deficit, and not just vague aches or pains.

Although there is some experimental evidence to support the theory of double crush syndrome, its existence as a clinical entity is seriously challenged by a number of recent investigators.

References (Double Crush Syndrome)

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Upton, A.R. and McComas, A.J.: The double crush in nerve entrapment syndromes. *Lancet*, 1973, 2:359.

Wilbourn, A.J. and Gilliat, R.W.: "Double Crush Syndrome: a critical analysis." *Neurology*, 1997. 49:21.