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The Role of Ultrasound in Flexor Tendon Injuries of the Hand

Thesis

Submitted for partial fulfillment of M.D. Degree in Radiodiagnosis

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Chris Nabil Hanna Bekhet

List of Contents

List of Tables

List of Tables (Cont...)

Table No.	Title	Page No.

List of Figures

List of Figures (Cont...)

List of Figures (Cont...)

List of Abbreviations

Abb.	Full term
A1 to A5	***Five Annular Pulleys***
C1 to C3	***Cruciform Pulleys***
CDUS	***Colour Doppler Ultrasound***
CTS	***Carpal tunnel syndrome***
DIP	***Distal interphalangeal***
ED	***Emergency Department***
FCR	***Flexor Carpi Radialis***
FCU	***Flexor Carpi Ulnaris***
FDP	***Flexor Digitorum Profundus***
FDS	***Flexor Digitorum Superficialis***
FPL	***Flexor Pollicis Longus***
IPJ	***Interphalangeal joint of thumb***
MCP	***Metacarpophalangeal***
MRI	***Magnetic Resonance Imaging***
MSK	***Musculoskeletal***
P1/PP	***Proximal Phalanx***
P2/MP	***Middle Phalanx***
P3/DP	***Distal Phalanx***
PACS	***Picture archiving and communication system***
PD-US	***Power Doppler ultrasonography***
PIP	***Proximal interphalangeal***
US	***Ultrasonography***

INTRODUCTION

The hand and wrist are the most important functional parts of the body in daily life activities and are frequently prone to traumatic injuries. They constitute 28 % of all musculoskeletal injuries and account for 14 % to 30 % of all treated patients in the emergency department ***(Schöffl et al., 2012).***

Although hand and wrist injuries are not life-threatening, but the consequences of misdiagnosis or a missed tendon injury can be devastating for the patient, as it can lead to fixed deformities compromising the patient's ability to work and perform normal daily activities. Hence, early diagnosis of the injured tissue is important for proper and early clinical management ***(Trybus et al., 2006).***

Assessment of hand injury is a difficult task in the Emergency Department, since the anatomy of the hand is very complex and the relationship of anatomy to function is still not entirely understood ***(Karabay, 2012).***

Also tendon injuries may be easily overlooked on routine clinical examination in Emergency Department due to multiple causes; such as the absence of a clinical test that can reliably detect partial lacerations, blood often obscures the field of view, limitation of movement may be exaggerated by pain or hematomas and deformities, which aid the diagnosis of tendon injury, are not usually present at the time of the initial presentation ***(Al-Hourani et al., 2018).***

The recent advances in US technology have made detailed examination of finger tendons possible in a dynamic mode. It has permitted the accurate evaluation of partial or complete tendon lacerations in direct (open) or indirect (closed) injuries and also helps to identify the site of the proximal stump when the tendon had been completely divided, thus decreasing the size of the surgical incision which prevents future complications as contractures and deformities ***(Jeyapalan et al., 2008).***

Ultrasound (US) scanning is now being increasingly utilised as a dynamic diagnostic tool with many advantages, such as being fast, more readily available, portable and cheaper over other imaging modalities and because of the dynamic and real-time nature of US, which allows scanning during movement, it may be considered as an extension of physical examination. Furthermore with the development of high resolution US transducers, detailed depiction of musculoskel-etal structures has improved.

However, despite all the advantages of US examination in the emergency department being dynamic, safe, non-invasive and inexpensive, US imaging of flexor tendons injuries has not been readily adopted by Surgeons treating hand injuries, because they are not fully aware of the usefulness of US in resolving clinical questions about the state of the tendon ***(Lapegue et al., 2015).***

AIM OF THE WORK

Our goal in this study is to highlight the role of Ultrasonography, as a non-invasive dynamic method, in the pre-operative evaluation of flexor tendon injuries in the hand and its potential value as an extension to physical.