



## Flexor tendon injuries

Hari Venkatramani, Vigneswaran Varadharajan, Praveen Bhardwaj, Aashish Vallurupalli, S. Raja Sabapathy

Plastic Surgery & Trauma Reconstructive Surgery, Ganga Hospitals, Coimbatore, India

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### ABSTRACT

Flexor tendon injuries have constituted a large portion of the literature in hand surgery over many years. Yet many controversies remain and the techniques of surgery and therapy are still evolving. The anatomical and finer technical considerations involved in treating these injuries have been put forth and discussed in detail including the rehabilitation following the flexor tendon repair. The authors consider, recognition and mastery of these facts form the foundation for a successful flexor tendon repair. The trend is now towards multiple strand core sutures followed by early active mobilization. However, the rehabilitation process appears to be one of the major determinant of the success following a flexor tendon repair. Early mobilization is essential for all the flexor tendon repairs as it is proved to improve the quality of the repaired tendon. The art of achieving the harmony between a stronger repair and unhindered gliding of the repair site through the narrow flexor tendon sheath simultaneously can be mastered with practice added to the knowledge of the basic principles.

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## 1. Introduction

Regaining satisfactory digital function after flexor tendon laceration and repair in the digit remains one of the most challenging problems in hand surgery. The inaugural issue of *Hand Clinics* was devoted to flexor tendon repair.<sup>1</sup> At least 135 full length articles have been published on this topic in the American & European volumes of the *Journal of Hand Surgery* in the last 5 years alone. Yet many controversies remain and the techniques of surgery and therapy are still evolving. A proper understanding of these injuries at the histological and biomechanical level is necessary to improve outcomes. Data regarding the incidence of flexor tendon injuries in an Indian context is lacking. A study from the USA estimates this incidence at about 14/100,000-person years,<sup>2</sup> while a study in a Finnish population puts the figure at 7/100,000-person years.<sup>3</sup> In a pediatric population (<16 years), 31 flexor tendon injuries were found out of a total of 391 hand injuries.<sup>4</sup> In the author's Centre (Ganga Hospital, Coimbatore) in the year 2014, out of the 3032 new Hand Surgery patients operated, 166 cases of flexor tendon injuries were treated, majority of which were a part of complex hand trauma with injury to multiple structures and fingers.

The first flexor tendon repair dates back to the 11th century, however the Galenian dogma, deterred the progress till the 17th

century.<sup>5</sup> Haller, through his experimental works, dislodged the belief and paved way for the attainments in this field.<sup>6</sup> Mason and Allen were the first to recommend immediate post-operative restricted or protected motion rather than complete immobilization,<sup>7</sup> to obtain better functional results for this "baffling problem" as remarked by Bunnell.<sup>8</sup> Their works were endorsed in the future by the doyens of hand surgery.

## 2. Anatomy and biology of flexor tendons

### 2.1. Anatomy of flexor tendons

There are two flexor tendons for each digit- flexor digitorum superficialis (FDS) and flexor digitorum profundus (FDP).<sup>9</sup> In the palm, the FDS tendons are superficial to the FDP but at the level of the MCP joint, the FDS splits into two slips (chiasma of Camper), allowing the FDP to pass between them and then become superficial to the FDS.

### 2.2. Pulley system

There is a fibrous flexor sheath surrounding the tendon extending from the neck of the metacarpal to the base of the distal phalanx. At certain places, the sheath is thickened, called the pulleys. Based on their general appearance, the pulleys are called

E-mail address: [drhariv@gmail.com](mailto:drhariv@gmail.com) (H. Venkatramani).