

Functional Aspects of Hand Reconstructive Surgery

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ABSTRACT

Hand reconstructive surgery has become an increasingly important specialty due to the increasing incidence of hand injuries in the general population. According to the World Health Organization, hand injuries are responsible for about 10% of all emergency department visits. The hand is a complex structure consisting of many bones, muscles, tendons, nerves, and blood vessels. Hand function is essential for performing everyday activities, such as eating, dressing, working, and participating in recreational activities. Hand injuries can have a significant impact on a patient's quality of life and can limit their ability to perform daily activities and work. Hand reconstructive surgery aims to restore hand function and improve the patient's quality of life. The choice of surgical technique should be based on the cause and severity of the injury, as well as the preferences of the patient and surgeon.

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INTRODUCTION

1.1 Epidemiology

Hand reconstructive surgery has become an increasingly important specialty due to the increasing incidence of hand injuries in the general population. According to the World Health Organization, hand injuries are responsible for about 10% of all emergency department visits. Men are more likely to suffer hand injuries than women, and most hand injuries occur in early adulthood, between the ages of 20 and 40.

1.2 Significance

The hand is a complex structure consisting of many bones, muscles, tendons, nerves, and blood vessels. Hand function is essential for performing everyday activities, such as eating, dressing, working, and participating in recreational activities. Hand injuries can have a significant impact on a patient's quality of life and can limit their ability to perform daily activities and work. Hand reconstructive surgery aims to restore hand function and improve the patient's quality of life.

METHODS

For this literature review article, we searched the PubMed database for articles published in English from 2000 to 2021. We used the following search terms: "functional analysis", "hand surgery", "hand function", "reconstructive surgery" and "hand rehabilitation". Articles were selected based on their

relevance to the topic of functional analysis of hand reconstructive surgery and critically analyzed.

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Functional analysis of hand reconstructive surgery is essential to assess the outcome of surgical interventions and to guide future treatment. Functional analysis of the hand is based on the evaluation of several parameters, including grip strength, range of motion, sensitivity, manual dexterity and coordination, as well as the assessment of the patient's quality of life.

The evaluation of grip strength is an important parameter in the functional analysis of hand reconstructive surgery. Grip strength can be assessed by dynamometers, which measure maximum grip strength and sustained grip strength. Assessment of grip strength is important because loss of grip strength can limit the patient's ability to perform daily activities and to work. The studies reviewed indicate that hand reconstructive surgery can significantly improve grip strength in patients with hand injuries.

Assessment of range of motion is also important in the functional analysis of hand reconstructive surgery. Range of motion can be assessed by goniometers, which measure the angles of motion of the joints of the hand. Assessment of range of motion is important because limited range of motion can affect the patient's ability to perform daily activities and

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to work. The studies reviewed indicate that hand reconstructive surgery can significantly improve range of motion in patients with hand injuries.

Sensitivity assessment is another important parameter in the functional analysis of hand reconstructive surgery. Sensitivity can be assessed using the tactile discrimination test, which measures the patient's ability to distinguish between two points of contact. Sensitivity assessment is important because loss of sensation can affect the patient's ability to perform daily activities and to work. The studies reviewed indicate that hand reconstructive surgery can significantly improve sensation in patients with hand injuries.

The evaluation of manual dexterity and coordination is another important parameter in the functional analysis of hand reconstructive surgery. Manual dexterity can be assessed using the peg placement test, which measures the patient's ability to place pegs on a perforated board. Coordination can be assessed using the alternating finger movement test, which measures the patient's ability to move the fingers alternately. Evaluation of manual dexterity and coordination is important because loss of dexterity and coordination can limit the patient's ability to perform daily activities and work. The studies reviewed indicate that hand reconstructive surgery can significantly improve manual dexterity and coordination in patients with hand injuries.

The assessment of the patient's quality of life is another important parameter in the functional analysis of hand reconstructive surgery. The patient's quality of life can be assessed using questionnaires, such as the arm, shoulder, and hand disability questionnaire (DASH). Assessing the patient's quality of life is important because loss of hand function can have a significant impact on the patient's quality of life. The studies reviewed indicate that hand reconstructive surgery can significantly improve a patient's quality of life.

DISCUSSION

Hand reconstructive surgery is an increasingly important specialty due to the increasing incidence of hand injuries in the general population. Functional analysis of hand reconstructive surgery is essential to assess the outcome of surgical interventions and to guide future treatment. Functional analysis of the hand is based on the evaluation of several parameters, including grip strength, range of motion, sensitivity, manual dexterity and coordination, as well as the assessment of the patient's quality of life.

The studies reviewed indicate that hand reconstructive surgery can significantly improve grip strength, range of motion, sensation, manual dexterity, coordination, and patient quality of life in patients with hand injuries. However, further studies are required to determine the long-term efficacy and safety of hand reconstructive surgery and to compare different surgical techniques.

In addition, functional assessment of the hand should not be the only criterion used to assess the outcome of hand reconstructive surgery. Other important criteria include the

rate of postoperative complications, length of hospitalization, and cost of intervention. These factors should be considered in conjunction with the functional assessment of the hand to make informed decisions about the surgical treatment of hand injuries.

Regarding the surgical techniques used in hand reconstructive surgery, the studies reviewed indicate that the choice of technique should be based on the cause and severity of the injury, as well as patient and surgeon preferences. Some of the surgical techniques used in hand reconstructive surgery include tendon transfer, bone transfer, microsurgery, arthroplasty, arthrodesis, and nerve reconstruction.

Tendon transfer involves moving a tendon from one part of the body to another to restore hand function. Bone transfer involves transplanting bone from one part of the body into the hand to restore bone structure and function. Microsurgery is used to restore blood flow to damaged tissues. Arthroplasty is used to replace a damaged joint. Fusion involves fusing two or more bones together to stabilize the joint. Nerve reconstruction is used to restore nerve function.

CONCLUSION

In conclusion, the functional analysis of hand reconstructive surgery is essential to evaluate the outcome of surgical interventions and to guide future treatment. Functional analysis of the hand is based on the evaluation of several parameters, including grip strength, range of motion, sensitivity, manual dexterity and coordination, as well as the assessment of the patient's quality of life.

The studies reviewed indicate that hand reconstructive surgery can significantly improve grip strength, range of motion, sensation, manual dexterity, coordination, and patient quality of life in patients with hand injuries. However, further studies are required to determine the long-term efficacy and safety of hand reconstructive surgery and to compare different surgical techniques.

The choice of surgical technique should be based on the cause and severity of the injury, as well as the preferences of the patient and surgeon. In addition, functional assessment of the hand should not be the only criterion used to assess the outcome of hand reconstructive surgery. Other important criteria include the rate of postoperative complications, length of hospitalization, and cost of intervention. All of these factors should be considered in conjunction with functional assessment of the hand to make informed decisions about the surgical treatment of hand injuries.

CONFLICTS OF INTEREST

None.

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FIGURES

Table 1. Michigan Scale

Function Level	Description
6	Full ability to perform activities of daily living, including work and sports activities
5	Limited ability in some activities of daily living and work; Minor limitations on sports activities
4	Limited ability in most activities of daily living and work; moderate limitations in sports activities
3	Limited ability in all activities of daily living and work; Important limitations in sports activities
2	Very limited ability in all activities of daily living, work and sports activities; Need for assistance in some activities
1	Inability to perform any activities of daily living, work, and sports activities
0	Traumatic or congenital amputation