Analysis on Making of Finger Prosthesis using Amputation Surgery Method

Sanjeeva Rao M*1, Venkateswara Rao J2, Ramarao Mannam3, Ardhanaari M3
1Department of Surgery, Konaseema Institute of Medical Sciences Research Foundation, Amalapuram, Andhra Pradesh, India
2Department of Obstetrics and gynaecology, Konaseema Institute of Medical Sciences Research Foundation, Amalapuram, Andhra Pradesh, India
3Department of Psychiatry, Meenakshi Academy of Higher Education and Research, Chennai, Tamil Nadu, India

ABSTRACT

India is a vast country with a large number of individuals in the community with various disabilities. It had been estimated that there are roughly 0.62 amputees in India per thousand population. This translates to close to more than one million individuals with amputations. Digital amputation is a common injury. This very often results in extensive functional disability and a substantial psychological impact. More importantly, the outcome of digital dysfunction is detrimental to the patient’s daily activities, such as buttoning a shirt or unlocking a door. Therefore, the overall goal for these patients is to rebuild a finger with the restoration of normal function, stability, length, and sensation. Prosthetic rehabilitation of amputated fingers is an attempt to rehabilitate aesthetics and limitedly function. A prosthesis will be a counterfeit body part that replaces a few of the work and presence of the absent major aspect. The kind of your prosthetic hand, finger alternately arm will rely on upon the area Furthermore period for your remaining finger or hand Also your practical Also lifestyle necessities. It is critical with impart those exercises that you feel need aid. The separable die allowed the silicone to flow into narrow spaces. Once the mould is filled with silicone, the flask is closed and pressure is applied slowly.

INTRODUCTION

Highly advanced prosthetic fingers like bionic fingers are astronomically expensive to the tune of $57000 to $73000. The professionally made expensive prostheses is not within reach of common man and hence an attempt is made to satisfy the needs of the amputees using the facilities of the dental clinic. (Jankelson, 2005) The twelve-year-old girl lost two fingers of her right hand, which were rehabilitated with silicone prosthesis using the limited resources of dental clinic and laboratory. (Swanson, 2013) Clinical and laboratory steps are described in this article. Two phalanges of the middle and ring fingers were lost in an accident and when the patient reported, the wound was completely healed and without pain or tenderness (Figure 1). (Scarr and Harrison, 2017) It was decided to make the impression of the palm and adjacent two fingers using putty and light body elastomer. The ventral portion was copied with...
Two phalanges were lost in accident putty which was subsequently relined with a light body. The dorsal portion of the fingers and palm was then covered with a light body. Over the light body, putty was applied to complete the impression (Figures 2, 3, 4 and 5). (Mayer, 2004) While making the impression that care has to be taken to keep the fingers apart. Cast is poured in dental stone (Figure 6).

The tissue surface of the impression was washed with soap and water. A thin coat of alginate mould separator was applied on the plaster surface before pouring dental stone (Figure 9) (Mujakperuo et al., 2010).

Features of the left hand fingers were copied in an
alginate impression and wax patterns were fabricated by pouring molten modeling. The wax coating was limited to 1mm thickness so that a hollow wax pattern was obtained. However, the tip remained solid. Wax pattern was modified to suit the features of the right hand. A trial was taken with the wax pattern on the patient (Figures 10 and 11) (Ouanounou et al., 2017).

The hollow portion of the wax pattern was filled with dental stone and a twin pin die pin was fixed. Length of the pin was adjusted to suit the requirements of the die (Fig 12-13).

A separable base was fabricated incorporating the pin. Adequate boxing was done with putty to make the base (Figures 12, 13, 14, 15, 16 and 17) (Gauer and Semidey, 2015).

Wax pattern with the die and its base was flanked in a large denture flask as in a denture. Dewaxing was done in a water bath and the two piece mould was thus prepared. Mould separator was applied and allowed to dry. Silicone was obtained and pigments like white, yellow ochre, red and burnt umber were added and mixed briskly. Silicone for
the nail portion is filled first with appropriate pigments and other portions subsequently (Figures 18 and 19) (Robert et al., 1995).

The flask is allowed to stay intact for at least 12 hours. The prosthesis is removed gently, excesses removed with sharp blades and the gloss eliminated by rubbing with plaster powder. The prosthesis is tried and usually suction developed inside will provide retention (da Silva et al., 2016).

The technique and materials used are available in any dental clinic or lab. Medical grade silicone sealants can be used for this purpose. Silicone sealants keep its elasticity and stability in both high and low temperatures. Furthermore, silicone sealant is resistant to other chemicals, moisture, and weathering in Figure 20.

An removal will be the removal, by mischance or by surgery, of a body part. Amputations in hand need aid generally the aftereffect of traumatic harm, in any case, might a chance to be those result of a wanted operation to prevent those spread about sickness Previously, a contaminated finger or hand. Occasionally, traumatically-amputated fingers might make replanted (reattached) in Figure 21. However, over a number cases, reattachment of the amputated finger is not time permits
or prudent in view an individual might make additional agreeable Furthermore have superior capacity. On the a component will be not reattached. This is because of danger that those reattached a piece Might make chronically painful, stiff, or need an abnormal alternately absent feeling (Cooper and Kleinberg, 2007).

Amputation Surgery

Pre-surgery

Former to a removal surgery, the specialist will do a watchful examination about your hand. Frequently all the specialist will acquire x-beams alternately different imaging investigations should survey those harm to your finger or hand. Those regions Furthermore amount for tissue that will make evacuated Throughout removal surgery will be In light of the degree of the damage and the well being of the remaining muscle to part (John et al., 2014).

Surgery

Done Numerous cases, the specialist has the ability with end those removal wound by rearranging skin. It might make necessary to abbreviate the bone or tendon thus that there’s enough delicate tissue with spread those bone. Sometimes, the specialist might must utilization skin, muscle alternately tendons starting with another and only your physique with a blanket the wound. All the more broad removal injuries, the specialist might shape those finger alternately the hand will have the ability to fit a prosthetic hand or finger after the fact.

Sometimes, it will be necessary to experience more than a particular case technique on support maximal length Also work of the harmed territory.

Recovery. To the initial few for weeks after removal surgery, you if anticipate a few aches. Torment might be controlled with agony medications, other medication, hand therapy, orthotics (braces alternately different supports), Also different techniques, for example, ice alternately high temperature. Same time you would healing, your specialist will let you how on wrap And administer to the surgical web page. Furthermore, The point when should give back of the office to catch up consideration.

On removal includes damage or surgery on your nerves, there might a chance to be a portion long haul side effects, for example, pain, icy sensitivity, abnormal sensations, or apparition sensation or pain, which will be At you feel that those absent piece will be still displayed. Keep your specialist dependent upon date for side effects; thus, suitable medicines might make executed. Though your side effects need aid incapacitating Also persistent, they could frequently figured out how for amendment surgery.

For example, you might feel touchy done an area, which will be created Toward a neuroma (an extended conclusion of the nerve that camwood make effortlessly irritated). There are new systems accessible that camwood makes supportive for A
percentage to mitigate neuroma pain (Fernandez-Gonzalez et al., 2015).

Treatment. Post-amputation, you might be alluded to a word related or confirmed hand specialist will assistance recover work and address torment and abnormal sensation. You’ll liable be given activities will Fabricate your quality And move forward range about movement or adaptability. You might make required should contact and move your skin will desensitize it And keep it versatile. Separate splints And steady units, for example, silicone gel sleeves might a chance to be furnished after your removal surgery. Guided engine imagery, mirror therapy, joint mobilization, tendon And nerve gliding, And blocking activities are regularly utilized to both a home Furthermore formal treatment project. Prosthesis. The majority is critical for your specialist and prosthetist thereabouts that a suitable prosthesis camwood a chance to be gave to you then afterwards an amputation (American Academy of Pediatric Dentistry, 2015).

An prosthetic hand or finger camwood a chance to be supportive from various perspectives and can:

- restore period will a incompletely amputated finger.
- empower Restriction between the thumb Also An finger.
- permit An hand amputee should settle Furthermore hold Questions for bendable fingers.

Though your hand is amputated through or over the wrist, you might be given a full-arm prosthesis for an electric or mechanical hand. A portion removal patients might choose not to utilize An prosthesis. An amputee coalition for America may be an additional supportive asset. These assets camwood assistance you on adapt to change Throughout recuperation. It will be fundamental to keep in mind that personal satisfaction of term may be specifically identified with mentality And desires — not only acquiring Also utilizing An prosthesis.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

Funding Support

The authors declare that they have no funding support for this study.

REFERENCES

American Academy of Pediatric Dentistry 2015. Acquired Temporomandibular Disorders in Infants, Children, and Adolescents. Council on Clinical Affairs, 40(6):366–372.

Cooper, B. C., Kleinberg, I. 2007. Examination of a Large Patient Population for the Presence of Symptoms and Signs of Temporomandibular Disorders. Cranio, 25(2):114–126.

da Silva, C. G., et al. 2016. Prevalence of clinical signs of intra-articular temporomandibular disorders in children and adolescents. The Journal of the American Dental Association, 147(1):10–18.

Fernandez-Gonzalez, F. J., et al. 2015. Influence of orthodontic treatment on temporomandibular disorders. A systematic review. Journal of Clinical and Experimental Dentistry, 7(2):e320–e327.
Gauer, R., Semidey, M. J. 2015. Diagnosis and treatment of temporomandibular disorders. *American family physician*, 91(6):378–386.

Jankelson, R. R. 2005. Neuromuscular Dental Diagnosis and Treatment. page 700.

John, T., et al. 2014. Orthodontic Treatment a Boon or Bane to TMJ. *IOSR Journal of Dental and Medical Sciences*, 13(10):63–66.

Mayer, D. 2004. Essential Evidence-Based Medicine. page 381. Illustriée.

Mujakperuo, H. R., et al. 2010. Pharmacological interventions for pain in patients with temporomandibular disorders. *The Cochrane database of systematic reviews*, 10:CD004715.

Ouanounou, A., et al. 2017. Pharmacotherapy in Temporomandibular disorders: A review. *J Can Dent Assoc*, 83(h7):1488–2159.

Robert, R., et al. 1995. Literature Review of Scientific Studies Supporting the efficacy of Surface Electromyography in the Diagnosis and Treatment of Tmd (Surface Electromyography). pages 265.

Scarr, G., Harrison, H. 2017. Examining the temporomandibular joint from a biotensegrity perspective: A change in thinking. *Journal of Applied Biomedicine*, 15(1):55–62.

Swanson, R. L. 2013. Biotensegrity: A Unifying Theory of Biological Architecture With Applications to Osteopathic Practice, Education, and Research-A Review and Analysis. *The Journal of the American Osteopathic Association*, 113(1):34–52.

Varga, M. L. 2010. Orthodontic therapy and temporomandibular disorders. *Rad Hrvatske akademije znanosti i umjetnosti: Medicinske znanosti*, 507(34):75–84.