RESEARCH ARTICLE

Current clinical practice of orofacial contracture management in head and neck burn patients among physical therapists of Hyderabad

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Abstract

Objective: To evaluate the current clinical practices of orofacial contracture management among physical therapists dealing with head and neck burn patients.

Method: The cross-sectional observational study was conducted at the Isra Institute of Rehabilitation Sciences, Hyderabad, Pakistan, from May 14 to December 31, 2021, and comprised physical therapists working in different hospitals and clinics and having clinical experience >1 year. Data was collected using a questionnaire based on literature which included questions related to demographics, service provision, clinical training, orofacial burn wound assessment, orofacial contracture intervention and outcome measurement in multiple choice, dichotomous or open response formats. Data was analysed using SPSS 22.

Results: Of the 100 subjects, 38(38%) were males and 62(62%) were females, while 71(71%) were aged 20-30 years, 22(22%) were aged 31-40 years, and 7(7%) were aged 41-50 years. Besides, 57(57%) physical therapists used stretching/exercise in the management of superficial-partial thickness burn, while 49(49%) used it in deep-partial thickness burn, and 44(44%) in full-thickness burn. Also, 43(43%) therapists used presence or maturation of the scar tissue as the indicator to escalate/reduce the intensity of the treatment. Regarding splinting, 49(49%) therapists used it on the 5th day of grafting and 35(35%) used it after complete healing.

Conclusion: There was minimal knowledge regarding the use of specific interventions and specific regimes at particular stages.

Keywords: Head burn, Neck burn, Orofacial contracture, Contracture management, Physical therapist.

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Introduction

Burn injury is a serious life-threatening health issue that affects public globally. According to a World health Organisation (WHO) report, estimated mortality rate related to burn was 180,000 per year, and, in Pakistan, 17% children with burn have temporary disability and 18% have permanent disability.[1] Burn injury is a less studied area in Pakistan. According to global burden of disease 2010 study statistics of age-standardised mortality rate related to burn is 5.8 per 100000 in Pakistan.[2] A study in Pakistan had a male-to-female ratio of 1.3:1 and mean age 26.64 years. Total body surface area (TBSA) burnt was 24.69% and mortality rate was 26.38%. Head and neck burn was the third most common area (49.7%) after arms (82.2%) and thorax (63.4%). It was followed by abdomen and genitalia (46.2%) and lower limb (45.6%).[3]

Burn is defined as a complex distressing injury of the skin or any other organic tissue that cause generalised or localised effects. Burn injury is caused by heat, cold, radiation, friction or chemicals etc.[1] Burns are classified as superficial burns, superficial partial thickness burns, deep partial thickness burns and full thickness burns based on the depth of the injury. Burn injuries cause metabolic disturbances inflammatory and immunological responses. The injury not only causes problems related to physical health, but also cause psychological discomfort, and negatively impacts patient's functional activities.[4] Aesthetic and functional changes may occur due to head and neck burns, which not only cause physical impairments but psychosocial impairments, such as post-traumatic stress disorder (PTSD), psychological distress, financial issues and problems with self-esteem and self-confidence as well.[5] Complications associated with head and neck burn include damage to facial and labial motor and sensory functions, restriction in oral opening and closing of mouth due to microstomia, which further progresses to oral incompetence, causing ineffectual management of saliva (drooling), lip eversion, improper access to intubation, compromised speech articulation, inadequate oral hygiene, and makes food/fluid containment in the mouth difficult when eating, which further increases the risk of periodontal diseases.[6] Contracture formation is the most common complication of burn injury which is the pathological result of excessive scarring and scar contraction. Contracture formation after the facial burn is the significant issue for eyelids and lips as they exert little

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resistive forces to the contractive forces.[7] Rate of contracture formation is high in burn patients which is 89.5% at the time of discharge and 76.5% after 6 months. The relationship between the time period after burn and prevalence of contractures is inversely proportional. The longer the time period after burn, the less is contracture developing prevalence.[8] Timing of surgical interventions and post-operative healing requires immobilisation which also increases contracture risk.[9] Myofibroblasts play an important role in the formation of contracture, which further leads to deformity, dysfunction and psychological burden, in burn patients. After the burn injury, the wound heals in three overlapping stages; inflammatory, proliferative and remodelling. Normally, myofibroblasts are limited and cleared by apoptosis, but if they persist in higher amount for longer duration and enhance the synthesis of alpha smooth muscle actin, transforming growth factor beta 1 (TGFB1) and other growth factors cause scar growth, which in turn leads to contracture formation. Other factors related to burn formation are disproportionate accumulation and breakdown of extracellular matrix, poorly arranged new fibres and microenvironments, including mechanical tension and integrin family.[10] There are several treatment options that have been described to treat facial contractures, but there is very limited evidence to support the efficacy of treatment options. Orofacial contractures related to burns can be managed either through surgical or non-surgical approach. Orofacial contracture rehabilitation is a multidisciplinary approach that involves various health professionals, like doctors, physical therapists, occupational therapists, speech language pathologists and nurses, etc. Combination of one or more different treatment options, such as massage, splinting, surgeries, early use of silicone gels, exercise therapy and compression masks, is more efficacious than an isolated treatment alone. It has not only shown improvement in orofacial myofunctional system, but in isolated joint movement also.[11] Orofacial contracture rehabilitation includes manipulation and stretching of the skin, scar tissues and orofacial muscles. It also includes exercises, which improve mastication and swallowing, and increase active range of motion (ROM) of the mandible.[12] Administration of massage therapy on hypertrophic scars improves skin's structural properties by rearranging the muscle fibres which is required for normal mobility.[13] Surgical approaches used to treat head and neck burns are tangential excision of dead tissue, grafting of the burnt area, regional/free flap or local flap reconstruction, reconstruction surgery with scar releasing, escharotomy and fasciotomy. Skin grafts include full thickness skin grafts, split thickness autografts, autografts, allografts, mesh grafts and sheet grafts, etc.[14] There are various interventions used to manage orofacial contractures after head and neck burns, but there is significant level of inconsistency in the clinical practices which are based on clinical experience. The current study was planned to evaluate the clinical practices of orofacial contracture management among physical therapists dealing with head and neck burn patients.

Subjects and Methods

The cross-sectional observational study was conducted at the Isra Institute of Rehabilitation Sciences (IIRS), Hyderabad, from May 14 to December 31, 2021, in different hospitals and clinics of Hyderabad, Pakistan. After approval from the ethics review committee of Isra University, Hyderabad, the sample size was calculated. It was estimated that as in Hyderabad, the Doctor Of Physical Therapy (DPT) programme was started in 2012 at the Liaquat University of Medical & Health Sciences (LUMHS) with 40 seats per batch, and from 2009 onwards, the average enrolment at IIRS is 25-30 students each year, the total estimated number of DPT graduates from Hyderabad up to 2020 is 610. Approximately half of the physical therapists either return to their hometowns or do not continue as clinical practitioners. So, by calculating via Raosoft® calculator[15] with an estimated population size of 305 led to a sample size of 171. However, due to the coronavirus disease-2019 (COVID-19) pandemic at the time, access to hospitals and clinical settings was difficult. As such, the sample size could not be met and the subjects were enrolled through simple random sampling technique comprising 14-15 physical therapists from each hospital/clinic, including Combined Military Hospital (CMH), Hyderabad, Isra university Hospital, LUMHS, Civil Hospital, Hilal-e-Ahmer Hospital, Shafay Hospital, Jeejal Maa Hospital, etc,

Those included were graduates of physical therapy having clinical experience >1 year who were willing to participate. Those who did not volunteer were excluded. Data-collection tool was based on a cross-sectional 2017 study done in Australia and New Zealand.[16] The questionnaire included items related to demographics, service provision, clinical training for practice, orofacial burn wound assessment, orofacial contracture intervention and outcome measurement, dichotomous or open response format with additional free text boxes.

Data was analysed using SPSS 22. Demographic data and variables were analysed using descriptive statistics, and was expressed as frequencies and percentages.

Results

Of the 100 subjects, 38(38%) were males and 62(62%) were females, while 71(71%) were aged 20-30 years, 22(22%)

were aged 31-40 years, and 7(7%) were aged 41-50 years. Overall 51(51%) physical therapists had experience of 1-4 years, 26(26%) had 5-10 years and 23(23%) had >10 years (Table 1).

Patients were usually referred to the physical therapists by burns doctor/surgeons 87(87%). When asked what aspects of orofacial burns / prevention of orofacial contracture interventions did they complete with other allied health professionals, 67(67%) therapists mentioned exercise/ stretching, 19(19%) splinting, 7(7%) massage and 7(7%) said pressure garments (Table 2).

Table-1: Demographics of the sample.

Question	n (%)
Age (years)	
20-30	71(71.0)
31-40	22(22.0)
41-50	7(7.0)
Total	100
Gender	
Male	38(38.0)
Female	62(62.0)
Total	100
How many years of experience do you have working with patients who have burns?	
1-4 years	51(51.0)
5-10 years	26(26.0)
> 10 years	23(23.0)
Total	100

Table-2: Responses related to service provision.

Question	n (%)
How are patients referred to you?	
Blanket referral	18(18)
Referral basis	82(82)
If you see patients on a referral basis, who usually refers them to you?	
Nurses	1(1.0)
Allied health	8(8.0)
Burns doctors/surgeons	87(87)
Other	4(4)
Which allied health disciplines are part of your Multidisciplinary Burns Team?(select all that apply)	
Physiotherapy	66(66)
Occupational therapy	36(36)
Speech pathology	32(32)
Nutrition and dietetics	30(30)
Psychology	23(23)
Psychiatry	26(26)
Social work	18(18)
Prosthetics/orthotics	40(40
Others	06(6)
What aspects of orofacial burns/prevention of orofacial contracture interventions do you complete with other allied health professionals?	
Exercise/stretching	67(67)
Splinting	19(19)
Massage	7(7)
Pressure garments	7(7)
Do you measure and fit facial garments?	
yes	44(44)
No	56(56)

Table-3: Responses related to the intervention.

Question	n (%)
What treatment/s do you generally, prescribe for orofacial contracture management for superficial-partial thickness burns? (Select all that apply)	
Splinting/Positioning	54(54)
Stretching/Exercise	57(57)
Massage	33(33)
Pressure Garments	24(24)
Silicon	17(17)
Other	9(9)
What treatment/s do you generally, prescribe for orofacial contracture management for deep-partial thickness burns? (Select all that apply)	
Splinting/Positioning	41(41)
Stretching/Exercise	49(49)
Massage	45(45)
Pressure Garments	32(32)
Silicon	28(28)
Other	8(8)
What treatment/s do you generally, prescribe for orofacial contracture management for full thickness burns? (Select all that apply	
Splinting/Positioning	42(42)
Stretching/Exercise	44(44)
Massage	29(29)
Pressure Garments	32(32)
Silicon	37(37)
Other	10(10)

Besides, 57(57%) physical therapists used stretching/ exercise in the management of superficial-partial thickness burn, 49(49%) used it in deep-partial thickness burn, and 44(44%) in full-thickness burn (Table 3).

Also, 43(43%) therapists used presence or maturation of the scar tissue as the indicator to escalate/reduce the intensity of the treatment. Regarding splinting, 49(49%) therapists used it on the 5th day of grafting and 35(35%) used it after complete healing.

Discussion

In the current study, the most common referral was made by burn doctors/surgeons (87%), while an earlier study reported the most common mode being blanket referral (70%).[16]

In the current study, only 44% respondents were involved in the measurement and fitting of facial garments, whereas 100% respondents were involved in an earlier study.[16]

Regarding interventions, exercise/stretching was most commonly used in all degrees of burns in the current study. In a previous study, much higher frequency of the

intervention was mentioned for each type of burn.[16]

The current study was conducted in a single city with a small sample size, which are its limitations.

Conclusion

There was low awareness about the range of interventions available, and threw as minimal knowledge regarding the use of a particular intervention and its regime at a particular stage in order to prevent and treat the orofacial contractures.

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