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# Clinical Effect of Comprehensive Rehabilitation Treatment for Deep Burns in Different Functional Joint Areas

Yong Li[1#*], Jie Huang[2#], Shumei Wang[3], Meng Li[4]

[1]Burns Department, Cangzhou People's Hospital, Cangzhou, Hebei, 061000, China

[2]Cerebrovascular Department, Cangzhou People's Hospital, Cangzhou, Hebei, 061000, China

[3]Department of Pharmacy, Cangzhou People's Hospital, Cangzhou, Hebei, 061000, China

[4]Rehabilitation Department, Nanpi County People's Hospital, Cangzhou, Hebei, 061500, China

#These authors contributed equally to this work

**Abstract: Objective:** To analyse the clinical effect of comprehensive rehabilitation therapy in patients with deep burns at different functional joint areas. **Methods:** Eighty-one patients with deep burns with different functional joint areas from April 2018 to April 2019 were divided into the conventional and rehabilitation groupings. The conventional group (n=40) received routine treatment and rehabilitation while the rehabilitation group (n=41) was given comprehensive rehabilitation treatment. Thereafter, the recovery of joint function in patients with deep burns in different areas, the combined value of clinical long-term treatment, the recovery of joint function and the score of daily living ability were calculated. **Results:** The total long-term effective rate of treatment, the recovery of the joint function, and the score of daily living ability of the patients with deep burns in the rehabilitation group were more favourable than those of the conventional group as demonstrated by $P<0.05$, the index data indicating statistical significance. **Conclusion:** Comprehensive rehabilitation therapy can reduce complications and improve the quality of life in patients with deep burns in different functional joint areas.

***Keywords:*** *functional site; deep burn; comprehensive rehabilitation treatment; clinical effect*

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**Corresponding Author:** Yong Li

youngerever@sina.com

## 1 Introduction

With the rapid development of social economy in recent years and the improvement of the level of burn treatment, the cure rate and survival rate of patients with large-area deep burns have been significantly improved. At present, the country has gradually focused on external burns and its rehabilitation medicine, and is committed to expand research on how to restore the patient's work and self-care abilities. In this, comprehensive rehabilitation treatment for burn patients were shown to actually able to omit early surgery, massage, bath, splinting, compression, radiation therapy, silicone film application and functional training[1,2]. As such, in order to evaluate the clinical effects of conventional and comprehensive rehabilitation, 81 patients with deep burns at different functional joint areas from April 2018 to April 2019 were selected.

## 2 Materials and methods

### 2.1 Basic information

The project's target cohort was 81 patients with deep burns at different functional joint areas from April 2018 to April 2019. The sample group study was conducted in the form of a random number table. The conventional group received 40 patients with a mixture of males and

females at a ratio of 20:20. In this group, the maximum age of the patients was at the age of 60 years old while the minimum age was 33 years old with the median age being (46.32±3.55) years old. On the other hand, the rehabilitation group has 41 patients, the ratio of male to female divided at 21:20, respectively. The maximum age was at 61 years old while the minimum age was at 32 years old and the median age was (46.55±3.21) years old. The basic data of patients with deep burns at different functional joint areas were statistically calculated, P>0.05, and the data indicators had no analytical significance.

Inclusion of sample criteria: in line with the clinical judgment criteria for deep burns in different functional joint areas, patients and their families have voluntarily signed the consent form of the treatment plan and obtained approval and recognition from the Medical Ethics Association.

Exclusion of sample criteria: exclusion of patients with mental disorders; exclusion of patients with major organ disorders; exclusion of patients with haematological disorders.

### 2.2 Methods

The conventional group carried out routine treatment while the rehabilitation group carried out comprehensive rehabilitation treatment. (1) Early intervention. After the medical staff has admitted the patient, it was necessary to correct the posture of the burned limb. According to the post-depression characteristics of the deep burn and the hyperplasia of the scar, the posture position of the burn patient was placed in an anti-collapse position or functional position. For patients with neck burns, it was necessary to adopt a shoulder height posture or an occipital posture, and fully recline the head; for the ankle and its upper limbs of the burn patients, it was necessary to fully positioned the upper limbs at an angle about 90°, straighten the elbow joint, and select the wrist joint to take the middle position, flexing the metacarpophalangeal joint about 60° to 70°, while extending the interphalangeal joint or flexing the interphalangeal joint 5° to 10°. The outreaching thumb is rested on the palm of the hand and the outreaching double lower limbs were placed at an angle about 45° to 60°. Additionally, the knee joint was straightened, and the ankle joint is positioned at an approximate 90°. (2) Surgical treatment. For patients who were within 3 to 4 days after the injury, these patients were required to undergo hernia operations. For patients with hypovolemic shock, anti-shock treatment was required in addition to a suitable physical condition before allowing the patients to be treated for deep II degree wounds on the normal tissues. For patients with grade III or higher, the wounds are cut into the deep fascia while appropriately preserving the patients' unobstructed subcutaneous vein and its healthy adipose tissue. Thereafter, the wound was then covered with large- and medium-thickness autologous skin grafts. After the surgery, these patients were then placed in extended and functional positions. At the same time, anti-inflammatory treatments were carried out. The wound dressings were changed after 4 to 5 days after the surgery and sutures were then performed 10 days after the operation. On the 2nd day after the suture removal, the patient involved was subjected to physiotherapy training mainly in carrying out active exercise, assisted passive exercise, and more importantly exercise all of the joints in all directions. After 1 week of treatment, a silicone membrane was then applied and an elastic bandage was used for pressure bandaging. This point on, the patient was allowed to perform 1 to 2 hours of daily baths or partial treatments as well as in conducting 1 to 3 body massages daily.

### 2.3 Indicator analysis

The total effective rate of clinical long-term treatments on the recovery of joint functions and daily activities of the patients with deep burns in different functional joints in both conventional and rehabilitation groups were observed and calculated.

(1) This article used the Barthel index to assess the daily living ability of patients with deep burns in the different functional joints of the conventional and the rehabilitation groups.

(2) Recovery of joint function: The recovery condition of the joint function was rated as follows: Excellent indicates that no joint deformity and joint dysfunction occurred; good represents a slight joint deformity, but has a normal joint function; moderate represents slightly improved without any joint deformity or dysfunction; poor represents that the joint function and its joint deformity demonstrated insignificant changes.

(3) Significant effect: Treatment of a cured scar in a patient was seen flattened and softened, closes to normal skin standards with no malformation, itching, joint disorders and pain, etc.,

ADL grade 4; effective: the patient slightly improved the position of the scar after treatment, basically close to normal, but in less than 2mm, there are mild pain, dysfunction, etc., ADL is between 3 and 4; invalid: patients with treatment of pain symptoms, dysfunction,

joint deformity is still relatively obvious, ADL is 1 to 2 Between the levels.

Effective: The patient has slightly improved scar position after treatment, which is similar to that of a normal situation, but less than 2mm, there is still mild pain, dysfunction, etc.; invalid: ADL between 3 and 4; the patient was treated for pain symptoms and dysfunction; ADL between 1 and 2; obvious joint deformity observed.

### 2.4 Data statistics method

Data statistical analysis were performed to evaluate the clinical long-term treatment efficiency, joint function recovery rate (%) form, the card group test and the daily living ability of both the conventional and the rehabilitation groups with different functional joint deep burn patients. The scores were expressed in the form of mean±standard deviation. All the data of 81 patients with deep burns in different functional joint areas were recorded using SPSS17.0 computer software, $P<0.05$. The index data demonstrated statistical significance.

## 3 Results

### 3.1 Calculation of the total effective rate of clinical long-term treatment for patients with deep burns in different functional joint areas of the conventional and the rehabilitation groups

According to the data calculation study, the total effective rate of clinical long-term treatment in patients with deep burns in the rehabilitation group was 100% higher than that of the conventional group ($P<0.05$), with the index data indicating statistical significance(Table 1).

**Table 1 Comparison of the total effective rate of clinical long-term treatment in patients with deep burns between conventional and rehabilitation groups**

| Group | Number of cases | Significant effect | Effective | Invalid | Clinical long-term treatment effective total value |
|---|---|---|---|---|---|
| Rehabilitation group | 41 | 26 | 15 | 0 | 100% |
| Conventional group | 40 | 20 | 14 | 6 | 85.00% |
| $X^2$ | | | | | 6.6420 |
| P | | | | | 0.0099 |

### 3.2 Calculation of the daily living ability scores of patients with deep burns in different functional joint areas of the conventional and the rehabilitation groups

According to the data calculation study, the scores for daily living ability of the patients with deep burns in different joint areas before intervention of the rehabilitation group was comparable with the conventional group data, $P>0.05$, which indicated the absence of statistical significance between the data. Meanwhile, the scores for daily living ability of patients with deep burns in the rehabilitation group after intervention when compared with the conventional group data, $P<0.05$, indicated statistical significance(Table 2).

**Table 2 Comparison of daily living ability scores of patients with deep burns between conventional and rehabilitation groups**

| Group | Number of cases | Before intervention | After intervention |
|---|---|---|---|
| Rehabilitation group | 41 | 72.32±4.11 | 96.36±4.22 |
| Conventional group | 40 | 71.52±4.32 | 86.39±3.25 |
| t | | 0.8540 | 11.8919 |
| P | | 0.3957 | 0.0000 |

### 3.3 Calculation of joint function recovery in patients with deep burns in different functional joint areas between conventional and rehabilitation groups

According to the data calculation study, the excellent and good rates of 97.50% of patients with deep burns in the different functional joint areas of the rehabilitation group when compared with the conventional group, 77.50%, $P<0.05$ demonstrated statistical significance(Table 3).

**Table 3 Comparison of joint function recovery in patients with deep burns between conventional and rehabilitation groups**

| Group | Number of cases | Excellent | Good | Moderate | Poor | Excellent rate |
|---|---|---|---|---|---|---|
| Rehabilitation group | 41 | 21 | 18 | 1 | 1 | 97.50% |
| Conventional group | 40 | 14 | 17 | 5 | 4 | 77.50% |
| X2 | | | | | | 5.6159 |
| P | | | | | | 0.0177 |

## 4 Discussion

The scar tissue after the burn wounds involving the reticular layer of the patient's skin is prone to contracture and hyperplasia, especially deep II and above burns. A large number of myofibroblasts can cause contraction of scar tissue, with the presence of actin filaments with contractile function parallel to the contraction direction[3,4]. After the shrinking of the tissue, the collagen fibres adhering to the surface of the myofibril becomes spiral or curved, and the muscle fiber cells or fibroblasts continue to synthesize the matrix and its collagen, and form a stiff structure near the cells, which leads to the appearance of scar tissue. As a result of the effects from hardening and contracture, joint dysfunction and deformity will eventually be induced, thereby affecting the mental health of patients, leading to their inability to take care of themselves. At present, the primary effective preventive method is to prevent wound scar contraction and hyperplasia at the same time, and it is worthy of extensive reference[5, 6].

The results of this study showed that the total long-term effective rate of treatment, the recovery of joint function, the score of daily living ability of the conventional group were compared in the deep burn patients with different functional joint areas of the rehabilitation group, $P<0.05$, and the index data had statistical significances for all the comparisons.

A study performed by Bai Yuzhong, Tan Longtan, Liu Zhenzhen et al[7] showed that 72 patients with deep second degree burns divided into control group (36 cases, routine functional exercise) and observation group (36 cases, early functional part of conventional functional exercise) demonstrated statistical significance in the effect of joint function recovery in patients with deep second degree burn when comparison was made between the observational and control groups, $P<0.05$. Meanwhile, the long-term excellent and good rates of the patients with deep second degree burns in the observation group was 100.00% compared with 83.33% in the control group, $P<0.05$. The index data had statistical significance which further confirmed that the early functional joint area plastic surgery for deep second degree burn patients can improve their joint function and improve long-term treatment effect. The results were consistent with the results of this study.

Taken altogether, it can be concluded that comprehensive rehabilitation treatment strategies for patients with deep burns of different functional joint areas showed superior therapeutic effects over conventional treatments.

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