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Case Report

Effectiveness of simple body image evaluation and manipulation for chronic pain: a case report

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ABSTRACT

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Introduction: We report a case in which chronic pain was successfully relieved using a new simple body image evaluation and body image manipulation based on the evaluation results.

Case: The patient, a man in his 60s, accidentally sustained a left ulnar trunk fracture and left hand degloving injury at work. Occupational therapy for approximately 2 years could not completely relieve pain in the ring finger (allodynia), causing difficulty in changing clothes and driving a car. Images of the left and right ring fingers were compared and manipulated using bandages to make the two images similar. Allodynia was reduced (visual analog scale 10 cm → 3.6 cm), and the ability to change clothes and drive a car improved.

Discussion: The bandage presumably changed the tactile and visual information inputs of size, weight, length, thickness, and thickness and reconstructed the perceptual-motor loop.

Key words: chronic pain, body image manipulation, body image evaluation, QOL

Introduction

Chronic pain requires treatment based not only on the illness, but also on the impact of pain on activities of daily living [1]. Treatment includes drug therapy, cognitive behavioral therapy, and body image manipulation. Non-steroidal anti-inflammatory drugs (NSAIDs), opioids, and nerve blocks can be used for chronic and acute pain; however, NSAIDs and opioids have side effects, and the effects of nerve blocks are uncertain. Cognitive behavioral therapy and classical body image manipulation methods require a proficient therapist, and facilities for implementation are limited. In recent years, tactile identification tasks [2], mirror therapy [3], and virtual reality systems [4, 5] have been used to manipulate body image to manage chronic pain. Body image manipulation is easy to implement; however, the body image evaluation method currently used is difficult to interpret because it involves drawing a self-portrait and using a multi-item questionnaire [6–10]. In addition, it is not sufficiently simple to be performed in a few minutes, and so is currently not widely used.

In this study, we devised a simple body image evaluation method and, based on the evaluation results, performed body image manipulation using bandages. We report a case in which chronic pain was reduced and movement and quality of life (QOL) were improved by using this approach.

Case

The patient was a man in his 60s who was accidentally pinched by a roller during work approximately 2 years prior and was diagnosed with a fracture of the left ulnar trunk bone and degloving injury of the left hand at our hospital.

Plate fusion was performed for the left ulnar shaft fracture. He continued with occupational therapy even after discharge for improving finger function, but the improvement gradually disappeared, and pain remained in the injured ring finger. Oral NSAIDs and opioids as well as neuropathic pain remedies had no effect on the pain; allodynia was present and elicited by simply placing the hand on a desk. His medical history included diabetes,

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hypertension, and dyslipidemia, and although drugs were prescribed for each disease, none were prescribed for pain at that time.

The range of motion on finger joint extension was within the normal range, but flexion was 60°/80°, 70°/55°, 50°/40°, and 55°/50° for the proximal interphalangeal joints (PIP)/distal interphalangeal joints (DIP) of the index, middle, ring, and little fingers, respectively. A slight decrease in the range of motion was observed; grip force was 45 kg on the right hand and 12 kg on the left, and pain in the ring finger was 10/10 cm on the visual analog scale (VAS).

Activities of daily living were generally independent, but due to pain in the left ring finger, it took longer for him to change clothes than for healthy subjects. He was engaged in machine maintenance work but was on leave.

Short-term goals of rehabilitation were to reduce pain and facilitate housework and driving. The period was set to 1 month, while performing body image manipulation. We initiated functional occupational therapy and housework movement practice for maintaining the range of motion of the joints. The long-term goal was to expand social participation.

First, the evaluator selected adjectives corresponding to the finger and that seemed to be usual from the words used to describe dimensional notation and the expression of palpation findings. Next, using the selected adjectives, we compared differences between the affected and healthy sides that the patient imagined (Table). Before body image manipulation, the image of the left ring finger revealed that it was smaller, lighter, shorter, thinner, harder, and colder than the right ring finger. Therefore, a bandage—a soft material—was wrapped around the left ring finger such that its size, thickness, length, weight, thickness, and hardness could pseudo-approximate those of the right finger. We attempted body image manipulation by adjusting the images so that they were equal (Figure 1). When both hands were placed on top of each other and compared, the actual size, thickness, and length of the ring fingers were almost the same. Immediately after body image manipulation, there was no difference between the left and right on the scales, except for hardness and warmth (Table). In addition, allodynia was alleviated, and anxiety when placing the left ring finger on a desk disappeared and the finger could be placed without hesitation. The patient then applied the bandage by himself at home and continued with occupational therapy once a week for approximately 4 weeks. There was no clear improvement in the range of motion and no significant change in grip strength, but the VAS pain score in the left annulus markedly reduced to 3.6/10 cm. Anxiety when using the upper left limb during driving and housework also reduced. Before treatment, the 0–100 scores on the subscales of SF-8™ (acute version) [11] were all below the national standard, which increased in all but one item after treatment. The feeling of health was almost the same as the national standard value (Figure 2). Thereafter, he lived with a bandage on his left ring finger, but after approximately 3 months, he felt uncomfortable when he bandaged it. There were no additions or changes to the oral medication. Differences between the left and right images of the ring finger disappeared without the bandage.

Table. Body image of the ring finger before and after the operation.

Before		After	
Size	Right(R) > Left(L)	Size	Right(R) = Left(L)
Weight	(R) > (L)	Weight	(R) = (L)
Length	(R) > (L)	Length	(R) = (L)
Thickness	(R) > (L)	Thickness	(R) = (L)
Width	(R) > (L)	Width	(R) = (L)
Hardness	(R) < (L)	Hardness	(R) < (L)
Warmth	(R) > (L)	Warmth	(R) > (L)
Moistness	(R) = (L)	Moistness	(R) = (L)

The affected side is on the left.
Select length, thickness, and width as usual words for dimensional notation (length × depth × width), and size, weight, hardness, warmth, and moistness as usual words for palpation findings. Is there a difference in. . . (adjective) on the left ring finger ? If there is a difference, which is more ? I asked. Before the treatment, the affected side felt small, light, short, thin, hard, and cold, but after the treatment, the hardness and warmth did not change. There was no difference between the left and right on other scales.

Figure 1. Body image manipulation method. By wrapping the bandage around the left ring finger, the thickness, length, weight, thickness, and hardness of the left ring finger were changed in a pseudo manner, and the images of the left and right ring fingers were adjusted to be equal.

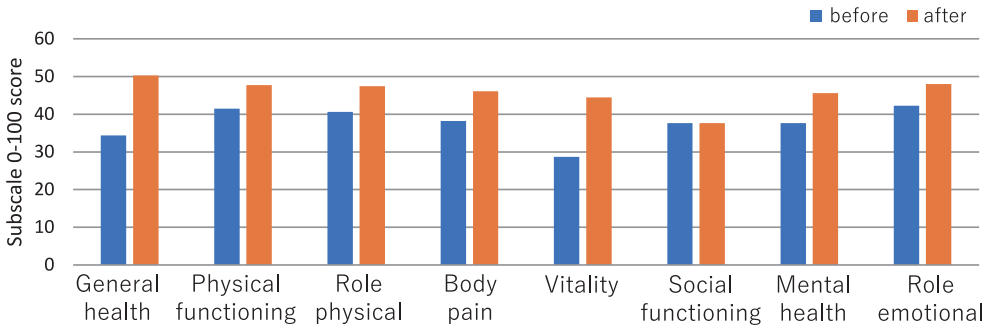

Figure 2. Changes in SF-8 before and after treatment.
The score increased by 0−100 after treatment for items excluding social life functions. Among them, the overall feeling of health reached the national standard value (50).

Discussion

Body image evaluation and manipulation were performed on a patient with chronic pain, and pain reduction and improvement in movement and QOL were observed.

Body image distortion occurs in patients with eating disorders, after brain injury, after amputation, and in postoperative complex regional pain syndrome (CRPS) [12, 13]. Most body image evaluation methods for eating disorders use an evaluation scale or drawing. The Body Image Assessment Tool, an evaluation scale, has five items as a construct and comprises 27 questions [6]. After brain injury, body image is often evaluated by drawing [7−9]. CRPS evaluation based on body image also comprises multiple questions [10]. Currently, there is no standard method for body image evaluation. In this case, we compared the image of the healthy side with that of the affected side and verified whether they were different. The question is simple and does not require drawing, so it is easy to ask and understand. This method is indicated only for body parts on both the left and right sides such as fingers and feet. While the evaluation is easy to perform, further studies are needed to evaluate the effectiveness of the approach.

Pain and dysesthesia appear when the integrity of the motor-sensory loop is broken [14]. In CRPS patients, the visual space can be accurately recognized in a bright place, but not in the dark, because visual space perception is deviated toward the affected side; the pain can be reduced by correcting the deviation using deviating prism glasses [15]. Thus, breakdown of the perceptual-motor loop is closely related to pain and body image distortion. Tactile discrimination uses the sensation of direct contact to reconstruct the perceptual-motor loop. The mirror therapy/virtual reality system is reconstructed using vision. This method is expected to reconstruct the perceptual-motor loop by utilizing the tactile and visual information of size, weight, length, thickness, and thickness by wrapping a bandage. This method is possible with fingers but is difficult with large limbs and could also not be adjusted for hardness and warmth. Visual information is the most important for the perceptual-motor loop [16], and it may be possible to expect short-term improvement by making the shape of the finger resemble an actual healthy finger. Allodynia is also associated with parietal lobe dysfunction, and a correlation exists between parietal lobe dysfunction-based physical perception problems and subjective pain intensity [17]. The pain disappeared even without the bandage possibly because the change in the sensory-motor loop by bandaging enabled daily use of the left ring finger and improved the parietal lobe function, which had been absent. The effectiveness of this method, including its relationship with brain function, should be examined.

Our body image evaluation and manipulation reduced pain and improved QOL in a patient with postoperative chronic pain. This method is low-cost, minimally invasive, and simple and may be an effective means of pain relief in patients with chronic pain.

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