Case Report: Treating the Patient With Digital Hypersensitivity

(fingers; hand injuries, therapy)

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Digital hypersensitivity is a functionally disabling condition, which often responds to conservative treatment with structured sequential desensitization. This case study describes the treatment hierarchy as the patient responds with objective improvement at each stage.

Editor's Note
The Case Report department was implemented by AOTA's Special Interest Section Steering Committee as a means of documenting the practice of occupational therapy for specific clinical situations. To keep this department flourishing, occupational therapists, especially experienced clinicians, are encouraged to submit their clinical examples. Guidelines are available from the Editor.

Occupational therapists often treat patients who display varying degrees of hypersensitive extremities. Prolonged local pain, vasomotor instability, and trophic changes in the soft tissue are typical symptoms occurring with this condition. The condition can often follow a minor traumatic incident and become exaggerated to the point of creating a very severe disability. The following case report illustrates a treatment procedure for digital hypersensitivity.

A 40-year-old female music teacher sustained a seemingly inconsequential knife laceration on the volar surface of the distal interphalangeal joint (DIP) of her left nondominant index finger in October 1981. There were no apparent tendon or nerve injuries, and the wound was primarily closed. Four months after the injury occurred, she returned to her physician with the complaint that she was unable to use the injured digit. She was referred to occupational therapy for evaluation and treatment.

The initial evaluation revealed the following:

1. General Appearance: There was a "pencil pointing" deformity of the index finger, slight hyperemia of the index tip, and decreased metacarpophalangeal (MCP), proximal interphalangeal (PIP), and distal interphalangeal joint flexion. No other abnormalities were noted in the left hand.

2. Range of Motion (ROM) of Left Index Finger:
   Active ROM was as follows:
   - MCP 0–75
   - PIP 0–80
   - DIP 0–45

   Passive ROM was as follows:
   - MCP 0–85
   - PIP 0–90
   - DIP 0–60

   The patient's total active motion (TAM) was 200 degrees (275 degrees being a normal range), and her total passive motion (TPM) was 235 degrees. The method of documenting these measurements followed the recommendations of the American Society for Surgery of the Hand (1).

3. Sensibility: The volar surface

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of the digit was hypersensitive from the DIP joint distally to the tip; sharp/dull discrimination was present to the fingertip; static 2-point discrimination was 4 mm on ulnar side and unmeasurable on radial side; a sweat test (Ninhydrine) showed a slight decrease in sweat to the fingertip; and a Tinel's sign was present on the radial side of finger at DIP level.

4. Grip Strength (handle level 2 on the Jamar Dynamometer):
   (R) 19 kg  (L) 17 kg
   Lateral pinch
   (R) 3.3 kg  (L) 2.8 kg
   Palmar pinch
   (R) 5.2 kg  (L) 1.1 kg
Although grip strength did not appear to be affected, her palmar pinch strength was only 34% of her unaffected right hand.

5. Functional Evaluation: The patient demonstrated a well-incorporated “extensor habitus” substitution pattern, in which the index finger was held in extension and not included in any activity. This was most evident when she was playing the piano or the drums, buttoning, and holding utensils while eating.

Summary of Evaluation: Although this was not evidenced at the initial examination, it is most likely that the superficial laceration injured the distal branches of the digital nerves as indicated by the Tinel's sign and the hypersensitivity. The hypersensitivity was the most limiting functional factor causing disuse of the digit; secondarily, finger tip pulp atrophy (pencil pointing) and decreased ROM contributed to her diminished pinch strength.

Based on the initial occupational therapy evaluation, the following treatment goals were established: The short-term goals included desensitization of the index fingertip and increased active ROM of the index finger joints. The long-term goal was to return the patient to a fully functional status with the index finger incorporated into all activities.

Treatment

Session 1: The desensitization treatment hierarchy was initiated as described by Hardy and associates (2) in 1982. This concept employs a sequential desensitization process. Progressive stimuli are introduced during therapy to match the progressive tolerance by the patient until the patient is able to successfully complete a simulated work activity. This patient was able to tolerate Level 1 activities (tuning fork vibration, paradox, and gentle massage), therefore her treatment was begun at Level 2 (vibration, friction massage, and constant touch/pressure). Paraffin was used before desensitization was begun because it tends to “soothe” the area. The patient’s home program consisted of friction massage, tapping the area with a pencil, and vibration (low-speed electric vibrator for 10 minutes) twice a day. A “fellow traveler” (a finger taped to another finger) was fitted to her index and middle digits to begin increasing ROM and to encourage the use of the index finger with the rest of the hand. During the initial desensitization process, the patient was instructed to push objects into theraplast using the index digit. Vibration was continued as before.

Session 2: A reevaluation at 1 week showed that her TAM had increased by 20 degrees in the left index finger and that there was a subjective decrease in hypersensitivity. Objectively, the area of hypersensitivity decreased to include only the radial pulp and the scar. Still, the patient continued to have great difficulty at work handling small objects and at home playing the piano and the drums.

Program Change: Texture identification was begun, and the patient was instructed to push objects into theraplast using the index digit. Vibration was continued as before.

Session 3: A reevaluation at 3 weeks showed that the patient's 2-point discrimination was 2 mm on the ulnar side of the index finger but remained unmeasurable on the radial side. TAM increased an additional 20 degrees. The patient reported decreased hypersensitivity with increased ability to control drum sticks and increased ability to play slow piano pieces although she was still unable to perform difficult pieces.

Program Change: Vibration was increased to a higher speed using the same time frame and frequency. Trials with functional skills increased: Typing and a small macrame project were added.

Session 4: A reevaluation at 5 weeks showed that the patient’s 2-point discrimination remained at 2 mm on ulnar side, but improved from previously untestable (10+

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This case report details a sequential desensitization program, which follows the patient from functional disability through full ability.

problems. A follow-up phone call 3 months after discharge revealed no regression.

Conclusion

This particular case illustrates positive results with a sequential desensitization procedure. The performance of work activities (or a simulation of these activities in the clinic) is necessary even if there is no residual hypersensitivity to allow the patient to regain confidence in using the injured digit/extremity.

Hypersensitivity and its response or lack of response to various treatments is poorly understood. It can be the result of frostbite, burns, nerve trauma, crush injuries, or diabetes, and it can become disabling. The occupational therapist can use the desensitization technique describing her in any clinical or home setting. It has the advantages of being noninvasive and relatively short term, which makes it valuable in treating functionally disabling hypersensitivity.

REFERENCES


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