

## Kinesio-Taping in the Successful Management of Hallux Rigidus: A Case Report

Gul Oznur Karabicak<sup>1</sup>, Zeynep Hazar Kanik<sup>2\*</sup>, Sevgi Sarpel<sup>1</sup>

<sup>1</sup>Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Baskent University, Ankara, Türkiye

<sup>2</sup>Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Gazi University, Ankara, Türkiye

\*Correspondence: Zeynep Hazar Kanik, Gazi University Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Ankara, Türkiye  
E-mail: zhazar@gazi.edu.tr

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### ABSTRACT

Hallux rigidus is a progressive degenerative disease of the first metatarsophalangeal joint. It is characterized by pain, limitation of the metatarsophalangeal joint motion, mainly dorsiflexion, progressive osteophyte formation and functional impairment. Although there have been many studies concerning non-operative management of hallux rigidus, no research has yet examined the effects of kinesio-taping in hallux rigidus. We present a 57-year-old woman with pain and stiffness around the big toe while walking, and functional insufficiency. The patient received kinesio-taping combined with therapeutic exercise. Pain intensity, range of motion (ROM), functional status were used as the outcome measures. According to the results, kinesio-taping may help reduce pain, increase the range of motion and functional levels in patients with hallux rigidus.

**Key words:** Hallux rigidus, kinesio-taping, pain, function

### INTRODUCTION

Hallux rigidus is a progressive degenerative disease of the first metatarsophalangeal joint [1]. Patients with hallux rigidus typically present with pain and stiffness at the first metatarsophalangeal joint, plantar calluses, and enlargement of the joint [2]. Radiographic findings include joint space narrowing, sesamoid hypertrophy and osteophytic lipping of the metatarsal head and proximal phalanx [3]. The pathophysiology of hallux rigidus is not yet fully understood, but it is considered to be multifactorial. Several risk factors for hallux rigidus have been identified and include an abnormally long or elevated first-foot bone (metatarsal), differences in foot anatomy, family history, increased age, traumatic injury to the big toe and female sex [4].

Non-operative management is always the first-line treatment for hallux rigidus. Non-operative management of hallux rigidus would include manual therapy, various taping methods,

foot orthoses, shoe and activity modifications, and injections with corticosteroid or sodium hyaluronate [5, 6]. Operative management of hallux rigidus is determined by the failure of non-operative treatment, the extent of arthritis and the deformity of the toe. Surgical procedures range from cheilectomy and arthroplasty to arthrodesis [6, 7].

Kinesio-Taping (KT) has become an increasingly popular treatment for musculoskeletal disorders including hallux rigidus. KT was designed to mimic the qualities of human skin. It has roughly the same thickness as the epidermis and can be stretched between 30% and 40% of its resting length longitudinally. Manufacturers of KT claim that it can alleviate pain, improve muscle strength, range of motion and function, facilitate lymphatic drainage, and correct joint alignment [8, 9]. The purpose of the present study was to examine the effects of KT on pain, the range of motion, and functions in a patient with hallux rigidus.

## CASE REPORT

A 57-year-old female patient (height: 160 cm, weight: 78 kg) presented with stiffness and pain around the big toe while walking. Her history did not show any systemic disease. The first examination of the patient was done with inspection. Although there was no deviation in the big toe, a bunion on the medial side was noticeable. Lateral posture analysis showed that the big toe was in plantar flexion in standing position, and the medial arch was found mildly elevated. Hammer toe deformity was observed in digits 2-4 (Figure 1). In the patient's clinical examination with palpation, dorsiflexion motion of the toe was found limited, and pain and

crepitation occurred with motion. Pain intensity of the patient during rest and activity were rated using Visual Analog Scale (VAS) as 7.2 and 9.5, respectively. The patient reported no night pain.

Active and passive hyperextensions of the big toe were measured with universal goniometer as 15° and 25°, respectively. In addition, functional status of the patient was evaluated with the American Orthopedic Foot and Ankle Score (AOFAS) and Foot Functional Index (FFI). Pre-treatment AOFAS score was found as 24 and the FFI score was found 63 for pain, 77 for limitation, and 25 for the quality of life.



**Figure 1.** Inspection of the patient with hallux rigidus

After the patient was informed about the taping procedure, KT was administered. Two Y-shaped kinesio-tape pieces were used. The first Y-shaped strip's base was applied on the base of the big toe. After the big toe was aligned to its estimated correct position with a mild to moderate tension, the tape was applied through the first ray. This correction was done once during the application of the tape and took less than 10 seconds. No traction was used. The second tape piece was applied over metatarsophalangeal joints with a mechanical correction technique on the big toe (Figure 2) [8, 9]. After the tape was applied, the patient was kept in the clinic for 15 minutes for a risk of allergic reaction. In the meantime, exercises were explained to the patient. The tape was replaced every other three days. Before the tape was replaced, the taping area was examined for possible allergic reactions.

Mobilization exercises were also taught to the patient. These exercises included the traction and dorsiflexion of the toe in sitting position. The patient puts the toe in traction and holds the position for at least 10 seconds. Then, keeping the traction, the patient adds a painless dorsiflexion position, and again hold the position for at least 10 seconds. Besides, to strengthen the intrinsic muscles, toe separating (abduction) exercises were also

taught. The patient was instructed to practice these exercises 3 times a day with 10 repetitions.



**Figure 2.** Kinesio-taping application for hallux rigidus

The treatment program also included shoe modification. To facilitate the pushing phase, a shoe modification including a rocker bar was added to the rehabilitation program. Rehabilitation program including exercises, shoe modification, and kinesio-taping was administered for 15 days. All evaluations were carried out after 15 days.

At the end of the treatment, rest and activity pain intensities were found as 2.8 and 3.6, respectively. Active and passive big-toe hyperextension were measured as 35° and 45°, respectively. AOFAS and FFI, both used to demonstrate the functional status of the patient, showed improvement. The AOFAS score was determined 57, and FFI score was determined 44 for pain, 62 for limitation, and 15 for the quality of life (Table 1).

**Table 1.** Results of outcome measures pre- and post-treatment.

| Outcome measures            | Pre-treatment | Post-treatment |
|-----------------------------|---------------|----------------|
| <b>Pain (VAS score, cm)</b> |               |                |
| Rest                        | 7.2           | 2.8            |
| Activity                    | 9.5           | 3.6            |
| <b>ROM (°)</b>              |               |                |
| Active hyperextension       | 15            | 35             |
| Passive hyperextension      | 25            | 45             |
| <b>AOFAS</b>                | 24            | 57             |
| <b>FFI</b>                  |               |                |
| FFI pain                    | 63            | 44             |
| FFI disability              | 77            | 62             |
| FFI activity limitation     | 25            | 15             |

(ROM: Range of Motion, AOFAS: The American Orthopedic Foot and Ankle Score; FFI: Foot Functional Index), (AOFAS maximal score is 100 points, indicating better outcomes), (FFI pain maximal score is 90 points, indicating worse pain; FFI disability maximal score is 90 points, indicating greater disability; FFI activity limitation maximum score is 50 points, indicating greater activity limitation)

## DISCUSSION

In the present case study, it was found that KT decreases pain, increases range of motion and improves function in hallux rigidus treatment. Pain level the patient had been suffering decreased significantly right after kinesio-taping. Throughout the 15-day treatment period, the patient was taped five times and the total changes in the VAS score of the patient was measured as a decrease of 4.4 in rest and 5.9 in activity. This outcome shows that the kinesio-taping application combined with exercises has a positive effect on pain. In the treatment of hallux rigidus, exercises and mobilization as part of conservative treatments have been

shown to have positive effects on the range of motion and strength, but no effects on pain [5, 6]. In the present study, the decrease in pain along with the increase in range of joint motion may be a result of KT accompanied by regular exercises. The decrease in range of motion in hallux rigidus is frequently associated with osteophytic changes and related decrease in joint space. The taping applied in the present study was very short-term and it is not expected to have an effect on such degenerative changes occurring in a very long time and has little potential to heal. However, Talarico et al. reported that sesamoid joint mobilization of the first metatarsophalangeal joint is helpful to improve the range of motion. This improvement was related to correct the biomechanics of this joint and the pulley mechanism of flexor hallucis longus tendon [10]. Therefore, the significant increase in the range of motion may be related with the decrease in pain as well as corrective and proprioceptive effects of KT. The improvement in the functional status of the patient, as evaluated by AOFAS and FFI was observed to be with the decrease of pain that had occurred during walking on the bunion and increased with activity. The decrease in pain intensity and the increase in the range of motion and functional status have been associated with the increasing elasticity of soft tissue around the joint.

In conclusion, the result of the present case report revealed that KT application accompanied by an exercise program might decrease pain, increase range of motion and improve function. It was determined that KT along with exercises could be an alternative approach in the non-operative management of hallux rigidus.

## REFERENCES

1. Arden N, Nevitt MC. Epidemiology. *Best Pract Res Clin Rheumatol.* 2006;20:3-25.
2. Mann RA. Hallux rigidus. *Instructional Course Lectures.* 1990;39:15-21.
3. Coughlin MJ, Shurnas PS. Hallux Rigidus: Demographics, Etiology and Radiographic Assessment. *Foot Ankle Int.* 2003;24:731-43.
4. Zammit GV, Menz HB, Munteanu SE. Structural factors associated with hallux limitus/rigidus: a systematic review of case control studies. *J Orthop Sports Phys Ther.* 2009;39:733-42.
5. Smith RW, Katchis SD, Ayson LC. Outcomes in hallux rigidus patients treated nonoperatively: a long-term follow up study. *Foot Ankle Int.* 2000;21:906-13.
6. Yee G, Lau J. Current concepts review: hallux rigidus. *Foot Ankle Int.* 2008;29:637-46.
7. Lau JT, Daniels TR. Outcomes following cheilectomy and interpositional arthroplasty in hallux rigidus. *Foot Ankle Int.* 2001;22:462-70.
8. Kase K, Wallis J, Kase T. *Clinical Therapeutic Applications of the Kinesio Taping Method.* Tokyo, Japan: Ken Ikai Co Ltd. 2003.
9. Kase K, Wallis J. The latest kinesio taping method. *Ski-Journal (Tokyo).* 2002.
10. Talarico LM, Vito GR, Goldstein L, Perler AD. Management of hallux limitus with distraction of the first metatarsophalangeal joint. *J Am Podiatr Med Assoc.* 2005; 95:121-129.