Treatment of Hallux Valgus by Hammond’s Operation and by Modified Chevron Osteotomy

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Abstract

In the first half of the period from 1975 to 1985 we treated patients with hallux valgus by Hammond’s operation, which is a modified Mitchell’s operation, and in the latter half by modified chevron osteotomy. Chevron osteotomy, as described by J.R. Corless, is a method in which a V-shaped osteotomy is done with the apex of the V towards the first metatarsophalangeal joint in the sagittal plane and the head is slid laterally. In modified chevron osteotomy, as described by J.L. Randall, the contact area of the osteotomy plane is increased and stabilized by the extension of both arms of the V.

Twenty-five feet were operated on in 17 patients, all female, with an age range of 23 to 63 years old (average: 46). Two of these patients had rheumatoid arthritis and one cerebral palsy. The average duration time of symptoms before operation was 26 months. Six patients were treated with Hammond’s operation and 11 with modified chevron osteotomy, with average operation times of 71 minutes and 42 minutes respectively. The time until full weight-bearing was 8 to 12 weeks with the former method and 4 to 6 weeks with the latter.

The average follow-up time was 7 months. Radiologically the intermetatarsal angle was corrected from $16 \pm 2^\circ (M \pm SD)$ to $11 \pm 4^\circ$ by Hammond’s operation and from $13 \pm 3^\circ$ to $11 \pm 3^\circ$ by modified chevron osteotomy. Tenderness and pain in walking disappeared or decreased in all of the former cases and in 80% of the latter. Based on the superiority of the operative procedure and length of postoperative care, we concluded that modified chevron osteotomy was a good operation for mild or moderate cases of hallux valgus.

Introduction

Hallux valgus is a static subluxation of the first metatarsophalangeal joint with lateral deviation of the great toe and medial deviation of the first metatarsal. Metatarsus primus varus has been considered a primary deformity and congenital by many previous authors. In addition, it is said that hallux valgus occurs almost exclusively in

key words: hallux valgus, Hammond’s operation, modified chevron osteotomy.
people who wear shoes. Once hallux valgus was a less popular disease in Japan than in western countries because shoes weren't worn often, but, with westernization, the number of the patients with this disease has recently increased. We reviewed cases operated on in the period from 1975 to 1985. In the first half of this period they were treated with Hammond's operation, which is a modified Mitchell's operation, and in the latter half of this period with modified chevron osteotomy. In this paper we will introduce the method of modified chevron osteotomy and report on the results of treatment by these two methods.

Operative procedure

The Mitchell's operation begun by C.L. Mitchell is based on the thought that in hallux valgus the correction of metatarsus primus varus is the most important point. A double osteotomy is done perpendicular to the axis of the shaft at the first metatarsal head and then the head is shifted laterally and plantarly, and fixed with a chromic catgut suture. In Hammond's operation, a distal osteotomy is done oblique to the axis of the shaft and then the valgus position of the metatarsal head is stabilized (Fig.1).

The chevron (V) osteotomy described by J.R. Corless is done with the apex of the V towards the metatarsophalangeal joint at the first metatarsal head and the head is slid laterally. And there is no internal fixation. In the modified chevron osteotomy of J.L. Randall the contact area of the osteotomy plane is increased and stabilized by the extension of both arms of the V (Fig.2).

Cases & Methods

Twenty five feet were treated in 17 female
patients whose range of age was from 23 to 63 (average: 46). Two patients had rheumatoid arthritis and one cerebral palsy. All of these patients had complained of tenderness of great toes and/or pain in walking. The average duration time of symptoms before operation was 26 months. Six patients were treated with Hammond's operation and eleven with modified chevron osteotomy (Table 1). We compared the two methods in regard to operation time, postoperative management, diminution of intermetatarsal angle, and subjective improvement of symptoms. The average follow-up time was 7 months.

Results

Examples of cases operated on by Hammond's operation and modified chevron osteotomy are shown respectively. Case 2 was a 31-year-old female with right hallux valgus operated on with Hammond's method. As is shown in Fig. 3, the deformity of the right great toe was corrected and the intermetatarsal angle was decreased from $15^\circ$ to $8^\circ$ (Fig. 4). Case 12 was a 50-year-old female with right hallux valgus that had been suffering from rheumatoid arthritis and was operated on with modified chevron osteotomy. As in the first example the deformity was corrected (Fig. 5) and the intermetatarsal angle was decreased from $17^\circ$ to $8^\circ$ (Fig. 6). Tenderness and/or pain in walking in both cases disappeared after the

<table>
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<th>Case (No.)</th>
<th>Age (Yr)</th>
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Table 1. Cases with Hallux valgus

N: Hammond's operation
C: modified chevron osteotomy

Fig. 3. A pre-and postoperative state of Case 2.

Note the correction of hallux valgus deformity.
Fig. 4. A pre-and postoperative x-ray of case 2.

Note the postoperative diminution of intermetatarsal angle.

Fig. 5. A pre-and postoperative state of case 12.

Note the correction of hallux valgus deformity.

Fig. 6. A pre-and postoperative x-ray of case 12.

Note the postoperative diminution of intermetatarsal angle.
operation and the patients are enjoying their daily life. Comparing the two methods with each other, the average operation time for one foot was 71 minutes with Hammond's operation and 42 minutes with modified chevron osteotomy. With respect to aftertreatment, a below the knee cast was applied for 6 weeks and full weight-bearing was begun at 8 to 12 weeks postoperatively in the former method. In the latter fixation by aluminium splint was applied for 4 weeks and full weight-bearing was begun at 4 to 6 weeks postoperatively. The preoperative intermetatarsal angle measured by Mitchell's technique was $16 \pm 2^\circ (M \pm SD)$ on patients treated by Hammond's operation and $13 \pm 3^\circ$ on those treated by modified chevron osteotomy. It decreased postoperatively to $11 \pm 4^\circ$ and $11 \pm 3^\circ$ respectively.

Disappearance or decrease of pain was found in all cases treated by Hammond's operation and in 80% of those treated by modified chevron osteotomy. No severe complication occurred with either procedure.

Discussion

Comparing the two methods, we found that Hammond's operation took a relatively longer time in operation and in postoperative treatment, but had good results. The reason for this was presumed to be that the weight-bearing surface at metatarsophalangeal joint, which was especially important in the cases with osteoarthritic change, was changed in the dorsoplantar plane. In contrast to this, modified chevron osteotomy was superior with respect to operation time and length of postoperative treatment. But severe cases, such as those with osteoarthritic change of first metatarsophalangeal joint, flat feet and other underlying diseases such as cerebral palsy, operated on by this method, especially had a tendency for some complaints to remain, especially concerning the improvement of subjective symptoms. As the cause for this the following factors were considered;

1) The preoperative intermetatarsal angle was larger than the mean value ($15^\circ$) and the corrective ratio of the intermetatarsal angle was small so that the resultant value of it was larger than the mean value ($11^\circ$). 2) The existence of an underlying disease such as cerebral palsy since the results of these cases with such factors were poor. Therefore as other authors have said, this operation is not suitable for cases with clinical or roentgenographic evidence of arthritic change or with neuromuscular disorders.

Conclusions

1) Compared with Hammond's operation, modified chevron osteotomy is superior in regard to operation time and postoperative care.
2) Hammond's operation is superior for the relatively severe cases such as those with osteoarthritic change of first metatarsophalangeal joint or those with some other diseases.
3) No severe complications happened with either procedure.
4) From the above results, we concluded that modified chevron osteotomy is a good procedure for use on moderate or mild cases with hallux valgus.

References


