**Forefoot Valgus- Plantarflexed First Ray**

The following chart is designed to clarify the various differences in forefoot valgus and plantarflexed first ray deformities. This illustrates the need for detailed information to properly evaluate and post these deformities.

Note 1: A relationship which is not totally rigid or flexible may be termed semi-rigid or semi-flexible depending on the examiner's inclination. This means that there will be a need to interpolate when applying orthotic therapy. This interpolation will be applied mainly by varying the degrees of posting. Therefore, it is important to remember that an increase of decrease in the plantarflectory force that the peroneus longus muscle exerts on the first ray is directly proportional to a corresponding increase in the rearfoot varus posting.

Note 2: The amount of forefoot valgus or rearfoot varus posting is determined by the anatomical relationship of the forefoot to rearfoot. Therefore, when posting, we do not arithmetically add or subtract one from the other.

Note 3: Subtalar joint pronation is a prime shock absorbing mechanism in the foot and leg. It is largely absent in rigid type feet. As a consequence, heel spur pain in the rigid foot is generally due to acute impact and shock against a taut plantar fascia. This is typically the type of shock received during sports activities. Therapeutically, this foot requires additional shock absorption through materials added to the orthotic devices. On the other hand, heel spur pain in the flexible foot is generally due to chronic pulling of the plantar fascia at its insertion into the periosteum covering the medial weight bearing tubercle of the calcaneus. This results in subperiosteal bleeding, leading to heel spur formation and requires reduction of the proximal to distal elongation of the foot through orthotic control.

| Relationship | Function | Type of compensation | Observations-symptoms | Observations-lesions | Principles of orthotic therapy | Applied orthotic therapy |
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| Rigid total type | 1. heel strikes ground inverted<br>2. starts to pronate but suddenly reverses and supinates | Supinatory | 1. lateral ankle instability<br>2. chronic ankle sprains<br>3. tripping<br>4. medial or lateral knee pain<br>5. sciatica<br>6. hammer toes<br>7. heel spurs<br>8. heel pain after activity<br>9. plantar fasciitis or pain | 1. callus and/or IPK sub first met head<br>2. callus and/or IPK sub fourth or fifth met heads | 1. prevent supinatory compensation in subtalar joints<br>2. lessen the peroneus longus vector on the first ray | 1. full forefoot valgus post<br>2. no rearfoot post or zero to two degrees rearfoot varus post for stabilization purposes depending on the degree of forefoot deformity<br>3. slight lowering of the calcaneal inclination angle<br>4. soft, shock absorbing material required for heel spur pain |

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| Flexible total type | 1. heel strikes ground inverted<br>2. starts to pronate<br>3. heel comes to vertical or beyond<br>4. first ray is moved dorsally and medially<br>5. lesser met segments abduct<br>6. foot pronates severely | Pronatory | 1. metatarsal bursitis<br>2. crowded, claw toes<br>3. soft corns<br>4. heel spurs<br>5. inferior calcaneal bursitis<br>6. intermetatarsal neuromas and neuroma-like symptoms | 1. shearing callus sub lesser met heads (mainly second or third)<br>2. IPKs sub second, third and/or fourth met heads<br>3. lesion pattern moves laterally is met adductus pattern is greater (sub second and fourth, or third and fourth met heads) | 1. prevent pronatory compensation in subtalar joint<br>2. increase the peroneus longus vector on the first ray<br>3. fully load and stabilize the forefoot around the oblique midtarsal joint axis | 1. full forefoot valgus post<br>2. full rearfoot varus post<br>3. no lowering of the calcaneal inclination angle or arch<br>4. soft material generally not required for heel spur pain |
| Rigid plantarflexed first ray type | 1. heel strikes ground inverted<br>2. little is any pronatory movement<br>3. first and fifth met heads strike ground forcefully | Supinatory | 1. lateral ankle instability<br>2. chronic ankle sprains<br>3. knee pain<br>4. sciatica<br>5. retrocalcaneal bursitis<br>6. Achilles tendonitis<br>7. hammer toes<br>8. heel pain after activity<br>9. plantar fasciitis or strain | 1. severe IPKs sub first and fourth or fifth met heads | 1. prevent supinatory compensation in subtalar joint<br>2. lessen the peroneus longus vector on the first ray | 1. slight forefoot valgus post<br>2. zero subtalar post for stabilization purposes<br>3. addition of a dancers pad for lesion accommodation<br>4. slight lowering of the calcaneal inclination angle<br>5. soft, shock absorbing material required for heel spur pain |

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| Flexible plantarflexed first ray type | 1. heel strikes ground inverted<br>2. starts to pronate<br>3. heel comes to vertical or beyond<br>4. first ray is moved dorsally and medially<br>5. lesser met segments<br>6. foot pronates severely | Pronatory | 1. metatarsal bursitis<br>2. crowded, claw toes<br>3. soft corns<br>4. heel spurs<br>5. inferior calcaneal bursitis<br>6. intermetatarsal neuromas and neuroma-like symptoms | 1. shearing callus sub lesser met heads (mainly second or third)<br>2. IPKs sub second, third and/or fourth met heads<br>3. lesion pattern moves laterally if met adductus pattern is greater (sub second and fourth or third and fourth met heads) | 1. prevent pronatory compensation in subtalar joints<br>2. increase the peroneus longus vector on the first ray<br>3. fully load and stabilize the forefoot around the oblique midtarsal joint axis | 1. full second to fifth metatarsal bar post with a first ray cut out<br>2. full rearfoot varus post<br>3. no lowering of the calcaneal inclination angle or arch<br>4. soft material generally not required for heel spur pain |