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Research Article

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Rotation Distortion Syndrome of Ankle Joint and Knee in Car Drivers and Passengers

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Abstract

The most common feet pathologies of children are valgus and valgus planus deformities, which are congenital or connected with neurological dysfunctions (Minimal Brain Dysfunction). In adults, and mostly in women, we observe:

1. *Köhler's disease among girls wearing improper shoes.*
2. *Insufficiency and pain of the front part of feet connected with limited toes flexion,*
3. *Valgus deformity of the big toes (hallux valgus),*
4. *"Ankle Joint Pain Syndrome" (AJPS)-sometimes also "Knee Joint Pain Syndrome" (KJPS)-described by us only in USA, India and Czech Republic. In presented article, we describe this special type of foot insufficiency- "instability of ankle or knee, or both joints"-on left leg in drivers and right leg in passengers in countries with right-hand traffic. More frequent it concerns the foot and article focus on this problem.*

Keywords: Chronic distortion of the ankle joint and knee, Swelling of foot, Chronic pain, Problems with walking.

Introduction

Anatomical Properties of Ankle Joint [1-16]

From functional point of view there are two important parts in the foot. Back part - tarsus-important in standing. Front part-important in walking and other activities like jumping, running (Figure 1 and 2). The ankle joint has two movements-dorsal and plantar flexion. Pronation and supination of the foot is in subtalar part of tarsus. Upper part of the talus-trochlea tail-is wider in the front than in the back and it is very important in climbing the stairs and hills. The talus is situated between two malleoli-coming from the tibia and from the fibula. It ensures proper functioning in every situation. If both malleoli were coming from one bone, from the tibia-it would result in problems with all foot functions and over time-in arthrosis.

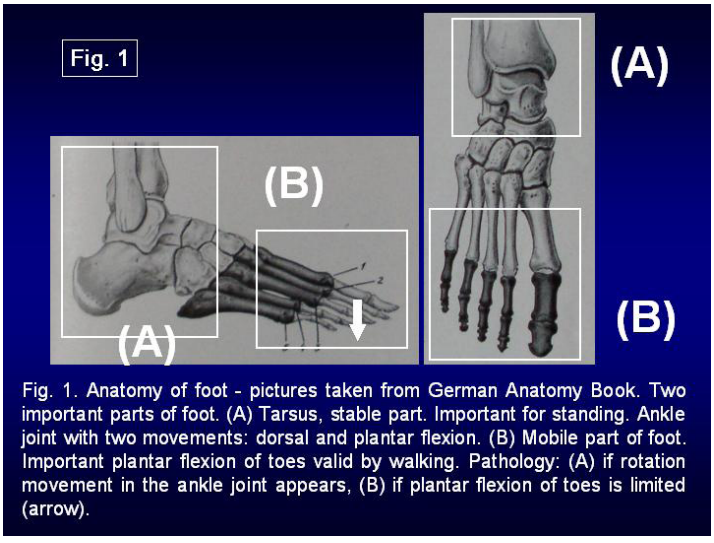

Fig. 1. Anatomy of foot - pictures taken from German Anatomy Book. Two important parts of foot. (A) Tarsus, stable part. Important for standing. Ankle joint with two movements: dorsal and plantar flexion. (B) Mobile part of foot. Important plantar flexion of toes valid by walking. Pathology: (A) if rotation movement in the ankle joint appears, (B) if plantar flexion of toes is limited (arrow).

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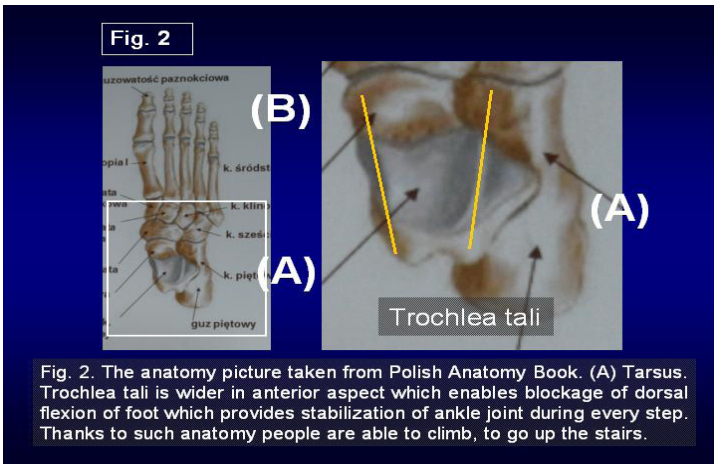

Fig. 2. The anatomy picture taken from Polish Anatomy Book. (A) Tarsus. Trochlea tali is wider in anterior aspect which enables blockage of dorsal flexion of foot which provides stabilization of ankle joint during every step. Thanks to such anatomy people are able to climb, to go up the stairs.

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Cause of Instability of Ankle Joint and Knee. Our Diagnosis Methods.

Over many years of our orthopedic activity we have had patients with swollen feet, fibrosis in region of tarsus and Achilles tendon-but only in 2012 we definitely found that it is because of rotation distortion, connected with driving. If the car drivers are getting out of the car-on one leg-on one foot–instability appears-mostly in ankle joint but in some patients, in the knee as well (Figure 3, 4, 5, 6). Physiologically the ankle joint has only two movements-flexion and extension and every rotation movement is pathological. In our patients - we observed the problem of left foot in drivers, and of the right foot in passengers. It happened similarly in Poland and Germany, right-hand traffic countries. Some house chores, including rotation of the body on fixed feet, could be also the cause of the same instability symptoms.

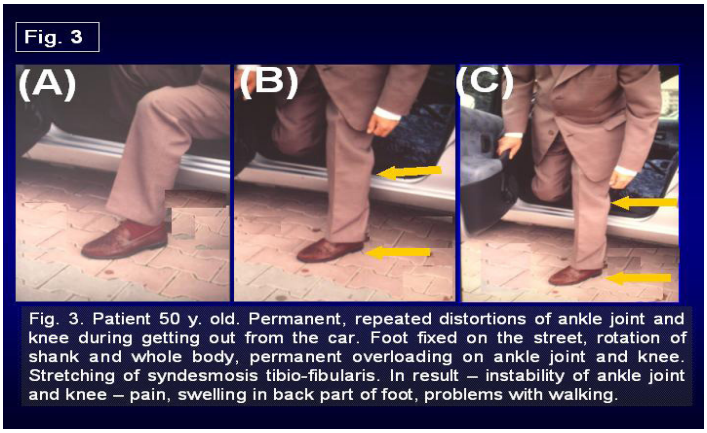

Fig. 3. Patient 50 y. old. Permanent, repeated distortions of ankle joint and knee during getting out from the car. Foot fixed on the street, rotation of shank and whole body, permanent overloading on ankle joint and knee. Stretching of syndesmosis tibio-fibularis. In result – instability of ankle joint and knee – pain, swelling in back part of foot, problems with walking.

Figure 3: Patient 50 y. old. Permanent, repeated distortions of ankle joint and knee during getting out from the car. Foot fixed on the street, rotation of shank and whole body, permanent overloading on ankle joint and knee. Stretching of syndesmosis tibio-fibularis. In result-instability of ankle joint and knee-pain, swelling in back part of foot, problems with walking.

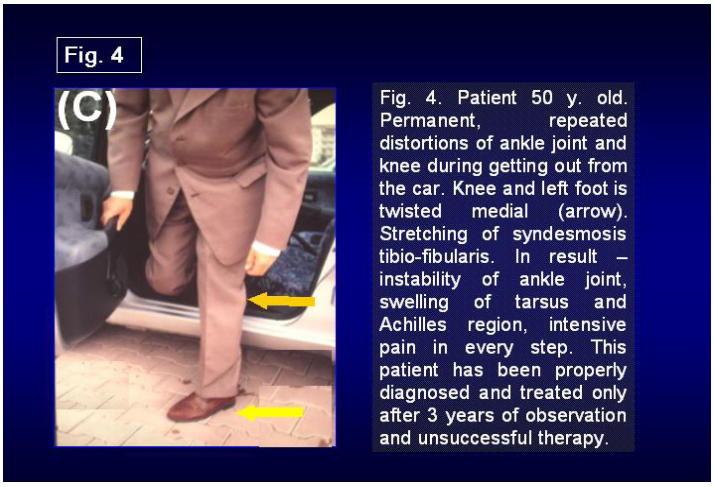

Figure 4: Patient 50 y. old. Permanent, repeated distortions of ankle joint and knee during getting out from the car. Knee and left foot is twisted medial (arrow). Stretching of syndesmosis tibio-fibularis. In result-instability of ankle joint, swelling of tarsus and Achilles region, intensive pain in every step. This patient has been properly diagnosed and treated only after 3 years of observation and unsuccessful therapy.

Fig. 5. Patient 65 years old, Four years, since 2011, of therapy by a general surgeon. No effect. Consultation in Lublin 2015. In anamnesis permanent distortion of left ankle joint by going out of the car. Clinical pain in left foot for 4 years as a result of instability of ankle joint, swelling, limping. After starting proper therapy - no pain after 3 months. Arrows shown place of distortion.

Figure 5: Patient 65 years old, Four years, since 2011, of therapy by a general surgeon. No effect. Consultation in Lublin 2015. In anamnesis permanent distortion of left ankle joint by going out of the car. Clinical pain in left foot for 4 years as a result of instability of ankle joint, swelling, limping. After starting proper therapy - no pain after 3 months. Arrows shown place of distortion.

Fig. 6. Patient 37 years old. Three years therapy by general doctors and surgeon. No proper diagnosis, no effect of therapy. Consultation in 2017. Clinically: full instability of the left ankle joint, swelling and hypertrophy in sinus tarsi and in Achilles region, pain by walking. Diagnosis: chronic distortion of ankle joint during getting out from the car. We recommended him to go out from the car on both legs and to makes dorsal and plantar flexions exercises of the foot. Good result after 2 month.

Figure 6: Patient 37 years old. Three years of therapy by general doctors and a surgeon. No proper diagnosis, no effect of therapy. Consultation in 2017. Clinically: full instability of the left ankle joint, swelling and hypertrophy in sinus tarsi and in Achilles region, pain by walking. Diagnosis: chronic distortion of ankle joints during getting out from the car. We recommended him to go out from the car on both legs and to makes dorsal and plantar flexions exercises of the foot. Good results after 2 months.

In examination we should prove the range of dorsal flexion of foot, stability in talo-tibial joint, stability of knee joint-of lateral ligaments and ligaments cruciatum. In pathology, we observe loss of stability in the ankle as well as in the knee. The Achilles tendon area, in sinus tarsi (lateral part of tarsus) swells often and very frequently we can see limitation of dorsal flexion of the affected foot. Many patients limp. Some patients try to walk "on toes"-in functional equines position but after a few days it becomes impossible due to the pain in the triceps sure region.

Material

Patients with Ankle Joint Insufficiency

The problem of "pain and insufficiency of the foot" has been observed for many years, but since 2012 we have been convinced, that the "foot illness" is connected with the distortion of ankle joint and often knee joint in drivers and also in passengers of small cars and it is connected with the moment of getting out of the car. Getting out of the car on one leg / one foot is the cause of the illness. In the last 9 years, we have treated 34 patients (N=34) suffering from chronic insufficiency due to the distortion of the ankle joint and leading to limitation of dorsal flexion of the foot and pain syndrome during walking. In right-hand traffic countries - like the authors' Country-Poland and Germany, in drivers (28 cases), this pathology is found in the left ankle, and in passengers (6 cases) in the right ankle joint. This illness is a new syndrome of foot pathology which has not been presented until our articles in the USA, India and the Czech Republic [14, 16-18].

Prophylaxis and Methods of Therapy

In examination, proper anamnesis in order to exclude other causes of foot insufficiency, is essential. It is important to prove the stability of ankle joint and knee joint in two axes-lateral and sagittal-to check the ligament collateral medial and lateral and ligament cruciatum. In therapy it is important to eliminate the "rotation-distortion movement" in getting out of the car. (Figure 7, 8). It is essential to put both legs on the ground in the same time while getting out of the car. The exercises of dorsal flexion of the foot are important as well. Extension, and only extension, exercises for the knee are proper. Here we would like to underline - in all knee problems we advise only extension exercises, never flexion-to-extension exercises. Only isometric exercises of the m. quadriceps are proper. Exercises in warm water are extremely beneficial - best in geothermal water. Additionally, we recommend laser therapy, ionophoresis, massage in water, exercises in geothermal water are especially effective.

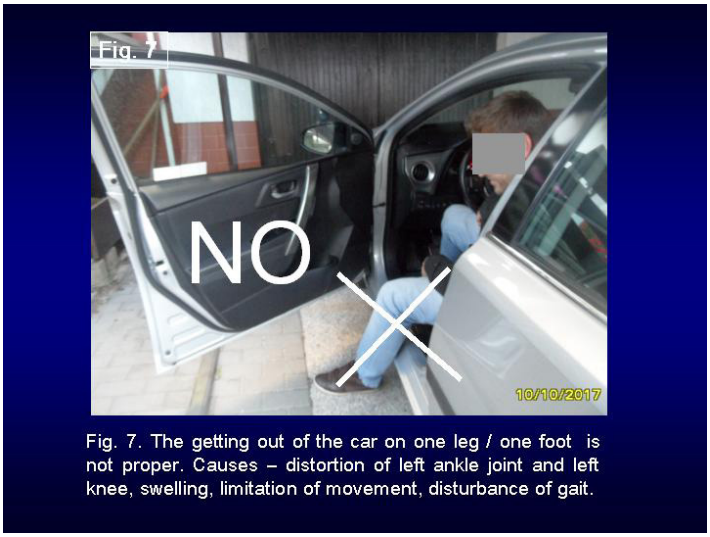

Fig. 7. The getting out of the car on one leg / one foot is not proper. Causes – distortion of left ankle joint and left knee, swelling, limitation of movement, disturbance of gait.

Figure 7: Getting out of the car on one leg / one foot is improper. Causes-distortion of left ankle joint and left knee, swelling, limitation of movement, disturbance of gait.

Fig. 8. Getting out of the car on both legs / on both feet is proper. It is the prophylaxis against distortion of left ankle joint and left knee. Important for drivers – left leg and passengers – right leg in countries with „right hand traffic rules".

Figure 8: Getting out of the car on both legs / on both feet is proper. It is the prophylaxis against distortion of left ankle joint and left knee. Important for drivers-left leg and passengers-right leg in countries with, right hand traffic rules".

Discussion

Deferential Diagnosis of the Feet and Knee Problems in Children and Adults

There are many different factors influencing insufficiencies of the feet or the knees associated with the pain. In our orthopedic practice we could notice such problems in children and in adults:

- Flat foot deformation in children and teenagers.
- Limited plantar flexion of the big toe and other toes, usually among adults suffering from forefoot pain, detected by flexion toe test [1-16].
- Halluces valgi-very frequent among women [1-15, 19].
- Foot insufficiency among girls-Köhler disease,
- Hereditary and neurogenic disorders of the foot in children and adults.
- In adult's knee Varus deformity or knee valgus deformity, with instability and pain syndromes and influencing the axis of feet.
- Knee flexion's contracture-the limitation of extension even a 3-5 degree constitutes a problem and causes pain (!).
- Recurvation of the knee-mostly both-in children and adults, as a symptom of Minimal Brain Dysfunction-very frequent [5, 7, 8, 10-12, 14, 18, 20, 21].
- "Ankle Joint Pain Syndrome" (AJPS)-sometimes also "Knee Joint Pain Syndrome" (KJPS) - are presented in literature only in our articles published in the USA, India and in the Czech Republic [16, 17, 20, 22--25]. In these articles we described this syndrome among drivers using mostly small cars. The cause of pain syndromes is loosening of stability of the ankle joint and / or the knee because of lengthening of synostosis tibiofibular and / or ligaments collateral fibulare and medial, ligaments and cruciatum of the knee. In result-pain, limping, difficulties with walking.

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Conclusion

1. We described a new pathology syndrome of the ankle joint or / and knee joint connected with a chronic rotation-distortion movement during getting out of the car.
2. These abnormalities are affecting the left foot of drivers and the right foot of passengers in right-hand traffic countries–like Poland, Germany.
3. Similar mechanisms can appear in physical work and in various daily activities, which provoke rotation of the trunk on the stabilized foot. Problems appear in the feet or / and the knees.
4. The symptoms of "Ankle Joint Pain Syndrome" (AJPS) or / and "Knee Joint Pain Syndrome" (KJPS) are: instability of the ankle joint or / and knee joint, swelling, pain, limping, sometimes patients are unable to walk longer distances, go up the stairs, climb hills and mountains.
5. In the therapy we advise-proper way of getting out of the car-both legs and both feet without any rotation movement of the trunk and proper kinesiotherapy, water massage, laser, diadynamic, ionophoresis.
6. Orthopedic surgeons, general surgeons, general doctors, family doctor should have familiarized with this "new unit in pathology of feet and knee" in connection of using of the cars.

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