Scientific Report on the VACOpedes Orthosis

1. Introduction report on the VACOpedes Orthosis

In the context of this scientific report, it was investigated whether the VACOpedes orthosis is suitable for the relief of pressure on the forefoot and therefore can be used in the treatment of metatarsal fractures, hallux valgus/rigidus, arthrodeses of the toe joints, hammer and club toes as well as big toe fractures.

2. Construction

The VACOpedes orthosis is produced and marketed by OPED GmbH. It consists of a skeleton-like plastic grid frame and a flexible anterior cover, which encloses the distal lower leg, the ankle joint and the foot together. The orthosis is closed using three velcro straps. A special rolling sole is attached to the underside of the stabilizing, plastic grid frame. An ‘insole’ consisting of a vacuum cushion and a towelling cover is fitted into the plastic grid frame. The vacuum cushion is filled with hard foam balls and has a valve through which air can be extracted or let in.
The vacuum cushions allow the "insole to be adapted to the anatomic shape of the individual foot and to immobilise by removing air via the valve using a vacuum pump. By opening the valve, the hard foam ball can be released, enabling it to be adapted to the shape of the patient’s foot again (e.g. in the case of declining degree of swelling). Here, there is no pressure on the foot/ the ankle joint and proximal structures. In addition, the orthosis can be further adapted based on swelling and atrophy using the velcro straps.

The VACOpedes can be cleaned in accordance with the operating instructions. VACOpedes is available in standard (shoe sizes 41 to 46) and small (shoe sizes 36 to 40) sizes.
3. Scientific Report

Below, a scientific opinion should now be given to the question as to whether the VACOpedes orthosis leads to the relief of strain on the forefoot and whether it can be used in the treatment of the fractures stated above or malposition.

The scientific report is based on the thorough knowledge of the following scientific publications:

1. Pressure measurements on the VACOpedes forefoot offloading shoe from the Clinic for Orthopaedics and Sports Orthopaedics at TU Munich, Director Prof. R. Gradinger, from June/July 2004.

2. Comparative investigations into plantar pressure relief through Vacodiaped vacuum orthoses from the OPED company by Armin Nagel, Dieter Rosenbaum, functional area of movement analysis at the Clinic and Outpatient Clinic for General Orthopaedics, Münster University Clinic.


Based on the data available and own clinical experience, the following indications exist for the use of the Vacopedes orthosis:

- Conservative and postoperative treatment of metatarsal fractures and toe fractures
- Post-operative treatment of hallux valgus/rigidus, arthrodesis of the toe joints, hammer and club toes

Explanation: The VACOpedes orthosis achieves immobilisation in the area of the metatarsals and toes with corresponding stabilisation through the vacuum cushion. Furthermore, the rolling process takes place via the fixed rocker sole and not via the forefoot. Ultimately, the use of burdening measurements (Orthopaedics and Sports Orthopaedic at TU Munich 2004) can show that, while using the Vacopedes, the strain of the load is shifted to the rear foot, meaning that the ratio of rear foot burden to forefoot burden is 77% to 23%. In this respect, the Vacopedes orthosis also has advantages over the conventional forefoot offloading shoe through its effective forefoot pressure relief: The vacuum orthosis achieves a higher
contact surface and relief in the midfoot area as well as a significantly lower pressure load in the rear foot compared to the forefoot offloading shoe. This allows pressure peaks and potential pressure points to be avoided.

The vacuum cushions allow the insole to be adapted to the anatomic shape of the individual foot and to immobilise and stabilise by removing air accordingly. By opening the valve, the hard foam ball can be released, enabling it to be adapted to the shape of the patient’s foot again. This allows the insole to be adapted individually to the degree of swelling or potential pressure points, without this resulting on pressure on the foot, ankle joint or proximal structures. In addition, the orthosis can be further adapted based on swelling and atrophy using the velcro straps.

In terms of stability, the Vacopedes orthosis is comparable with a conventional plaster cast. It is superior to a traditional cast however due to its higher level of comfort during wear as well as improved hygiene. Compared to the forefoot offloading shoe, there is a significant advantage of a more equal distribution of pressure in the midfoot and rear foot areas, while also avoiding pressure peaks and therefore also potential pressure points. The option to adjust the vacuum cushions to the individual presents a further advantage over other types of care. Overall, the VACOpedes orthosis allows earlier mobilisation in the care of forefoot injuries and forefoot operations due to the even distribution of pressure pattern along with pressure relief on the forefoot, increased comfort and individual adaptability. The risk of incorrect use is to low to merit mentioning.

Handling the Vacopedes orthosis is easy and largely self-explanatory. Using the pump to remove the air from the vacuum cushion is generally demonstrated once and understood by the patient. The only risk compared to conventional plaster treatment lies in the potential removability of the orthosis, meaning that, in treatment with plaster casts, the risk in patients with low compliance is lower, but does involve the disadvantages regarding overloading of the forefoot as mentioned above. Overall, the multiple advantages of the VACOpedes orthosis outweigh a calculable risk. The risk/benefit ratio of the VACOpedes orthosis is largely positive.
4. Summary
The VACOpedes orthosis can be adjusted and readjusted to the individual and sealed using the vacuum cushion and the velcro straps, regardless of the shoe size and side. The plastic grid construction immobilises, stabilises and relieves pressure on the forefoot. As stated above, the following indications exist for the use of the Vacopedes orthosis:

- Conservative and postoperative treatment of metatarsal fractures and toe fractures
- Post-operative treatment of hallux valgus/rigidus, arthrodesis of the toe joints, hammer and club toes

The risk/benefit ratio is positive, i.e. there are more advantages than calculable risk.