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Technical note

RTV silicone insoles

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Abstract

A cheap and fast method of providing long term accommodating insoles is described. Room temperature vulcanizing (RTV) silicone rubber is used, with suitable coverings, to provide pain relief and support for feet and ankles. The combination of physical properties of the finished item provides a useful balance between support and flexibility which results in these insoles being readily accepted by the patients.

Introduction

This technical note describes a technique which may be of use to people wishing to make a cheap but effective accommodating insole. It has been used in Derby UK for the alleviation of pain due to a valgus heel, for the accommodation of flat feet, and to provide support for dropped metatarsal heads. The technique is easily learnt and is quick, providing a cheap and long lasting insole.

Method

A cast of the foot is obtained by preparing a pad of putty, about two inches thick, large enough to provide a full footprint. The putty is slightly warmed so that it flows into the contours of the foot evenly. A fine layer of plaster of Paris is sprinkled on the top surface of the putty. The same powder is applied to the sole of the patient's foot and the patient is then requested to place the foot on the pad and apply weight normally to the foot whilst standing. The foot is then carefully removed and the resulting impression filled with a slurry of Kafir-D. Once the mould has set it can be removed from the putty which can be rolled up, kept on one side, and used on another occasion. As the linseed oil in the putty oxidizes it can be replaced by anhydrous lanolin which enables the useful life of the putty to be extended to about a year. The mould is examined and any small defects corrected; if any modifications are required, i.e. to support a particular dropped metatarsal head, they can be done at this stage. The cast is now ready for the insole to be moulded on top. Room temperature vulcanizing (RTV) silicone rubber is used (Silcoset 153)* and this is spread over the

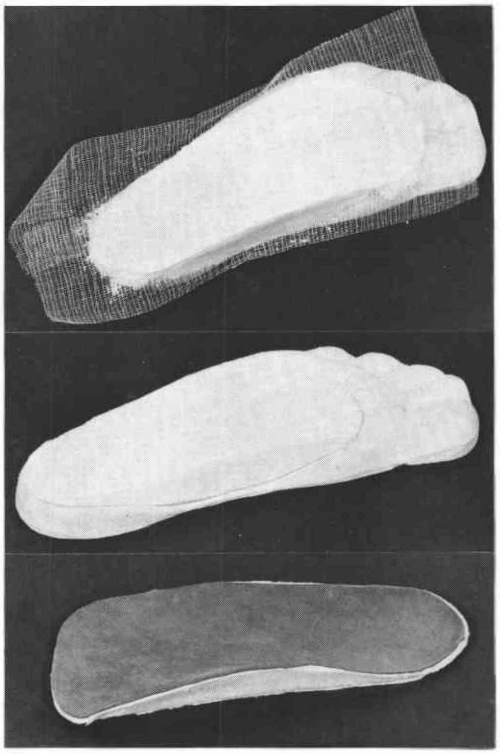

Fig. 1. Top, the untrimmed RTV insole in place on the cast of the foot showing the coarse weave cotton scrim used to provide a smooth base. Centre, the uncovered insole trimmed to approximate size. Bottom, the finished insole ready to fit to the patient.

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surface of the cast using flexible metal spatulas and built up to provide a flat sole. A coarse weave cotton scrim is used to provide a smooth surface on the bottom of the insole (Fig. 1, top). The insole then has to be left for at least 24 hours to enable the vulcanizing reaction to complete. If necessary this can be speeded up by putting the cast insole into an oven at a low temperature i.e. 40–50°C. After the 24 hour period a check must be made that all the silicone in the thicker regions such as the instep have vulcanized. Sometimes there can be a pocket of unvulcanized rubber inside these thicker regions. The insole can now be trimmed with an ordinary pair of scissors to the approximate size (Fig. 1, centre) and coverings attached. These coverings cannot be glued on with any conventional adhesive, and it was found that Silcoset 105 (a liquid RTV silicone) could be painted on to both the insole and the covering and the two pressed together to cure. The Silcoset cures by the addition of a catalytic hardener. The rate of cure can be adjusted to suit the situation but a few minutes is usually sufficient. The base of the insole is usually covered with a chamois leather or similar and the top with a thin smooth leather or leather substitute (Fig. 1, bottom).

Fitting to the patient is simple, requiring only a few minutes with the aid of a pair of scissors. These insoles last for some considerable time, it is only the covering material which wears out and this can be easily replaced. The resulting insole is flexible enough to move with the foot during walking but is sufficiently resilient to provide support where required. The total cost of materials amounts to £3–£4 and the time required to make this, discounting the time taken for the RTV silicone to vulcanize, is about one hour. The insole can be easily transferred to different footwear so only one need be made in most circumstances.