

THE REPARTITION OF PRESSURES WITHIN THE FOREFOOT.

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The authors tried to quantify through photoelastopodometry, in individuals having their foot resting in repose, the repartition of pressures within the forefoot. The technique that was used is derived from the photoelastopodscopy, and the procedure of the experiment is outlined below.

A carpet with built-in steel spherules is placed between the foot and a birefringent material so that the pressure beared by the various individual spherules is visualized as concentric circles, the diameters of which are proportional to the loads. The respective load on any spherule is expressed as a percentage of the total load on all spherules. The measurements were made on a population sample of one hundred and fifty boys divided, according to their age (respectively 8, 13 and 18 years), into three groups of fifty individuals each. Solely prints of the forefoot were considered, and a statistical study was performed on the total number of these prints. For quantifying the repartition of pressures only the first two rows of spherules (those corresponding with the forefoot) were taken into account.

The respective loads, expressed in percents, were plotted on a graph from which a typical curve was obtained for any one forefoot; each of these curves thus gives an image of the repartition of pressures in the forefoot.

The procedure enabled to differentiate between six different types of curves. The statistical analysis, of these curves led to the conclusion that for only 3% of the observed cases the maximum charge was on the inner and the outer sides (pallet) of the forefoot, whereas for 58% of the cases the middle part

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of the forefoot beared a proportionately heavier charge than the inner and the outer pallets.

After comparing these results with different theories found in the literature dealing with bone mechanics, the authors note that their findings on the distribution of pressures in the forefoot disagree to some extent with the commonly described pattern of such pressures distribution.

Indeed, though it is generally acknowledged that the load in the entire forefoot is only on the first and fifth metatarsi, the results from the present experiment indicate that such a statement applies to not more than 3% of the foot-prints here investigated.