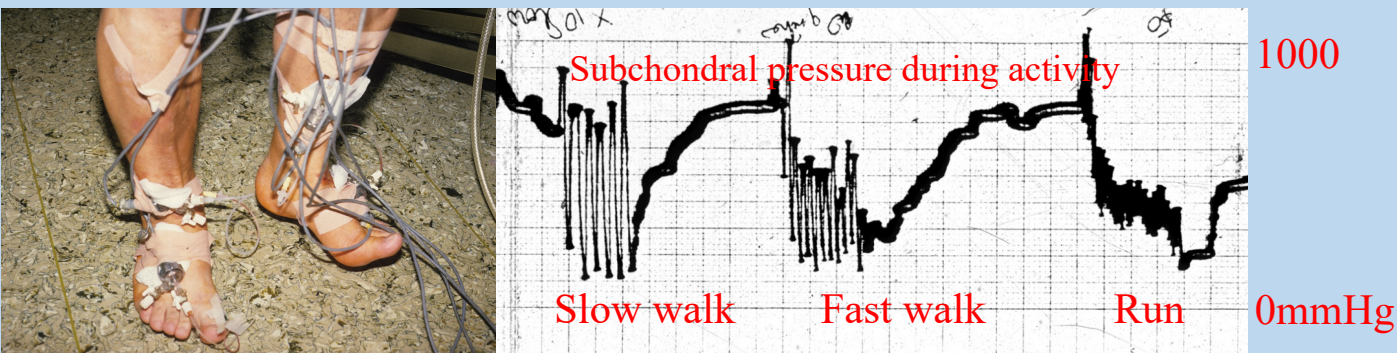


HYDRAULIC FORCE LOAD TRANSMISSION IN JOINTS

Background

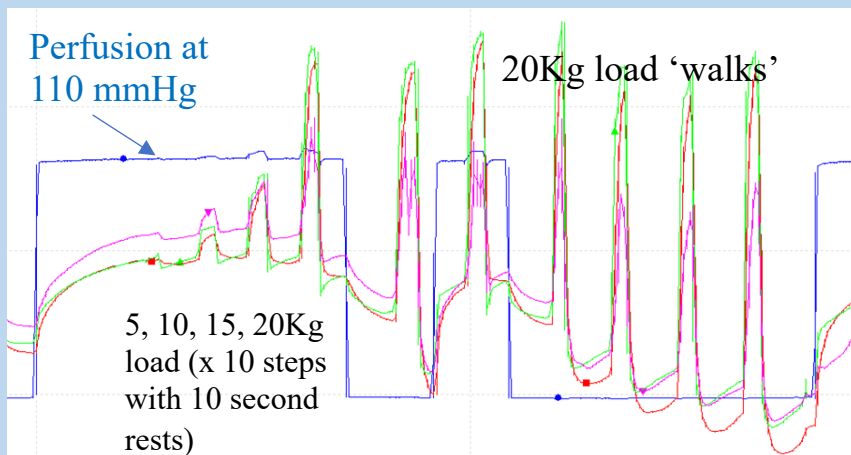


With loading very high fluctuating subchondral intraosseous pressures (IOP) occur.

Method
 Perfused calf foot model with intraosseous pressure recording during ex-fix loading



Results



Perfusion - fills bone slowly
 Load - gives instant rise
 IOP - proportional to load
 Exceeds perfusion pressure
 Even when not perfused
 Repetition 'pumps out'
 Must be a valve in system

Conclusions: IOP only reflects perfusion at the needle tip, and is affected by vascular obstruction and load. High pressures occur under the joint surface. Bone is micro-flexible. Bone fat is oily or fluid at body temperature and acts as a hydraulic pressure transfer medium. Previously undescribed vessels run in the subchondral plane consistent with marks seen on MRI scans. At the cortical margin, complex distortions exist which act as choke-valves. With a raised surrounding intraosseous pressure, they close to prevent turbulent flow in and out of the subchondral bone. Load is transferred partly by hydraulic pressure.

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