

The skeletal key

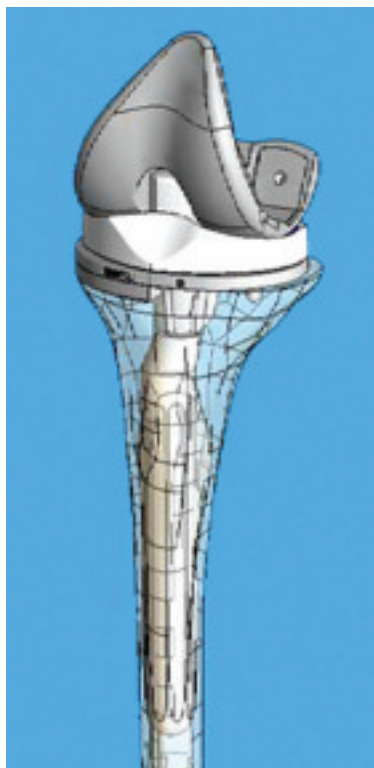
The Bone and Joint Decade has underlined the need for investment in musculoskeletal research, argues Dominique Pioletti, of the Laboratory of Biomechanical Orthopedics...

One of the major achievements of the global, multidisciplinary Bone and Joint Decade (BJD) initiative was to make non-specialists of this domain realise two things. First, it highlighted the impact of pathophysiological problems related to the musculoskeletal system on quality of life. Secondly, it put into perspective the impact that musculoskeletal related problems have on the healthcare system.

Looking at figures reported in different professional societies, such as The Burden of Musculoskeletal Diseases in the United States¹, the effects of musculoskeletal diseases are very heavy and the associated costs are tremendously expensive. While it is clear that this situation can only become even more marked in the future due to the ageing of the population, paradoxically the public research investment in the musculoskeletal field is low compared to its real impact on public health.

Most people know someone who has had their life ruined by a disability related to a musculoskeletal problem. It could be a relative who had an osteoporotic fracture of the femur during a fall and could never recover completely, a friend who had damaged his cartilage in a soccer game and is no longer able to practise his favourite sport, someone with a chronic back problem and no real solution available to relieve pain, or even more dramatically, a tibial fracture that does not heal. All these examples highlight the fact that a healthy musculoskeletal system is essential for a good quality of life, which is why research in this field is necessary.

Indeed, there are many fields of research in bone and joint that deserve better support, including osteoporosis, arthritis, back pain, spinal deformity, non-union fracture, or genetic disorders such as *osteogenesis imperfecta* or skeletal dysplasias to cite only some of them. Even a common fracture such as the one in the tibial plateau can still be very difficult to treat and can lead to a significant rate of disabilities. For this particular situation, development



A biomechanical analysis of a knee implant with an artificial bone scaffold placed below the tibial insert

of new biomaterials with high mechanical properties will be needed urgently.

The particularity of the research performed in bone and joint is its inherent multidisciplinary aspect. For example, a study on osteoporosis can be performed at the cell and molecular levels to understand the intrinsic mechanism leading to a decrease in bone density and impaired bone architecture. The hallmark of an osteoporotic bone is its susceptibility to fracture due to its resulting weakness from a biomechanical point of view. The research in osteoporosis will then necessitate the contribution of biologists, engineers such as biomechanicians, and obviously physicians. Multidisciplinary research has been followed for many years in the musculoskeletal field and was probably more difficult to fund initially, as not many experts in multidisciplinary research were able to offer expertise in the field of the proposed studies. This may explain the low research investment observed in the musculoskeletal field.

There is, however, a trend in science to develop multidisciplinary research, and therefore no more barriers should stand in the way of the financial support of musculoskeletal research that can have a real impact on a person's quality of life.

¹ <http://boneandjointburden.org/>



Dominique P Pioletti PhD
Assistant Professor
Laboratory of Biomechanical Orthopedics
Tel: +41 21 693 83 41
dominique.pioletti@epfl.ch
lbo.epfl.ch

