In summary, the main developments over the last few decades have been in the change in basic concepts concerning the pathophysiology of the disease, which have moved from a fairly mechanical hypothesis to include a number of interactive pathways explaining the global structural changes in joint tissues.

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FEMORO-ACCETABULAR IMPINGEMENT: FREQUENT INITIATOR OF OSTEOARTHRITIS OF THE HIP

Reinhold Ganz

We describe a mechanism for osteoarthritis of the non-dysplastic hip in which the degenerative process is initiated by impingement between the proximal end of the femur and the acetabular rim rather than by axial overload within the joint. Relatively minor abnormal anatomical orientation and morphology of the acetabulum and the proximal end of the femur could be identified as to reduce the clearance for motion and to lead to impingement of the well constraint ball and socket joint. Most frequent place of impingement is the anterio-superior joint area and most critical motion is flexion-internal rotation.
As acetabular causes for impingement local or general overcover due to acetabular retroversion or a deep socket could be verified, both conditions known to contribute to chronic hip problems. As femoral causes a head with a non-spherical periphery, malalignement between head and neck, reduced anteversion of the neck and a low cervico-diaphyseal angle have been identified. Pistol grip deformity and retrotilt of the femoral head being part in this list are known as to be associated with early osteoarthritis. Excessive demand on hip motion seems to accelerate the destruction as well as velocity and force of its critical excursion.
With surgical dislocation of the hip joint new insights of the pathogenetic process were possible allowing to reproduce impingement as the damaging cause, Two types of impingement could be distinguished differing in the injury pattern at the acetabular rim: The cam impingement is caused by the femoral end, where its pathomorphology with an increasing radius is jammed into the acetabulum during forceful motion. The resulting shear forces produce abrasion of the acetabular cartilage and its outside-in avulsion from labrum and subchondral bone in a rather constant antero-superior area, while the cartilage of the femoral head, in its spherical part, remains normal. Later in the disease mechanical overload and chronic irritation may contribute to the joint deterioration. The degeneration of the labrum is secondary to the disconnection from the cartilage. The pincer impingement produces a more linear impact between a local or general overcover of the acetabulum and the femoral head-neck junction. With this type, the first structure to fail is the acetabular labrum. Damage to the acetabular cartilage is first limited to a small strip near the labrum. Later and as a result of the chronic leverage, damage to posterior-inferior joint cartilage becomes apparent. Again the cartilage of the spherical head in its superior surface remains normal over a long period. Acetabular cartilage damage from pincer impingement seems to develop slower and is less extensive than with the cam impingement, however most hips show a mixed cam- and pincer-impingement.
Based on the observation of about 2000 hips we speculate that the pathogenesis of most primary and secondary types of osteoarthritis is best explained by the impingement concept.

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IS SURFACE REPLACEMENT AN ALTERNATIVE TO CONVENTIONAL THR?

Peter Grigoris

Total hip replacement (THR) is a successful reconstructive procedure for patients with arthritis. Despite the excellent results in older patients, the outcome in the active patient younger than 55 years is generally poor as reported by various national arthroplasty registries [1]. The principal cause of failure is wear of the articulating surfaces resulting in the production of particulate debris which insights a localised inflammatory tissue reaction causing bone resorption and prosthetic loosening
Metal on metal hip resurfacing is an alternative procedure to conventional THR with a low wear producing articulation. It has the advantage of preservation of proximal femoral bone stock at the time of surgery and avoidance of long-term stress shielding. Revision surgery, if required, should therefore be easier and more durable. In addition, the large diameter of the articulation, offers increased stability and range of movement for the active individual [2].
The concept of hip resurfacing is not new. It has evolved directly from the original mould arthroplasty introduced by Smith Petersen in 1948. In the early 1950s, Sir John Charnley, the pioneer of conventional THR, experimented with hip resurfacing using Teflon, which was a material with poor wear characteristics. In the 1970s, cemented systems using a polyethylene acetabular component and a metal femoral cup were introduced around the world. The results were disappointing and the procedure was largely abandoned by the mid 1980s. The large diameter of the articulation combined with thin polyethylene cups or liners, led to accelerated wear and the production of large volumes of biologically active particulate debris leading to bone loss and implant loosening. However, as the implications of wear debris induced osteolysis were not fully appreciated at the time, failure was attributed to other factors primarily avascular necrosis of the femoral head, and femoral neck fracture. The failure of previous generations of hip resurfacing was essentially a consequence of the use of inappropriate materials, poor implant design and inadequate instrumentation rather than an inherent problem with the procedure itself.
The renaissance of metal-on-metal articulations for THR began in 1988 when Bernard Weber developed the Metasul™ bearing [3]. The availability of a durable low wear bearing which could be used in a large diameter articulation enabled the introduction of new generation of hip resurfacings in 1991. By the end of 2004, the majority of the main implant manufacturers had introduced metal-on-metal hip resurfacing systems. To date, only short to medium term results are available, but these results are much better compared to the earlier metal on polyethylene resurfacings. The complications commonly seen in the 1970s and 1980s, such as early implant loosening and femoral neck fracture now appear to be rare [4,5].
Concern has been raised about the biological effects of the elevated levels of metal ions and metal particles found in blood, periprosthetic tissues and lympho-reticular system in all patients with metal-on-metal bearings. However, to date, there is no evidence that patients with metal-on-metal bearings in situ are more likely to develop such malignancies when compared with the general population [6].
Further work will be required to establish the prevalence of femoral neck fractures and avascular necrosis of the remaining femoral head. Long term observational studies and controlled trials will be required to determine if the potential advantages of hip resurfacing compared to conventional THR are realised. Whilst early results should be regarded with caution, the present generation of metal-on-metal hip resurfacings potentially offer the ultimate bone preservation and restoration of function in appro-