



The Department of Rheumatology researches the prevention and treatment of arthritis, particularly osteoarthritis (OA). We have undertaken a number of clinical trials in OA that cover a wide spectrum of therapeutic strategies from orthotics to vitamin D to stem cell transplantation. By using MRI-based assessment of the knee and hip joints, we have been able to examine the role of lifestyle factors such as physical activity and obesity prior to the development of clinical disease. This offers a novel approach to determining what is good or bad for joints. For example, we showed that contrary to widespread belief, physical activity is good for knee joints, the exception being situations where joint injury co-exists.

The effect of obesity on joints is proving interesting. Our results suggest that the effect of obesity is not simply due to loading on the joints, but that obesity affects joints by both loading and metabolic factors. This has raised the interesting concept of obesity related meta-inflammation (metabolic triggered inflammation) potentially playing an important role in the progression of OA.

In 2010, Professor Flavia Cicuttini was awarded the triennial Parr Prize for Research by the Australian Rheumatology Association (ARA), PhD student Dr Andrew Teichtahl was awarded the New Investigator Prize at the ARA national meeting, and research fellow Dr Donna Urquhart and PhD student Trish Berry won the prestigious Spine Young Investigator Award for 2010.

#### Key research findings:

- Sharon Brennan, PhD student, showed that avoiding weight gain in women during early to middle age is likely to have a significant impact on the risk of knee OA in a publication in *Arthritis Research Therapy*.
- As part of her PhD, Trish Berry showed in a publication in *Arthritis and Rheumatism* that higher bone remodelling is associated with reduced cartilage loss. This suggests that targeting bone may provide a new approach to treatment and prevention of knee OA.

- In publications in *Arthritis Research and Therapy* and *Rheumatology* respectively, PhD student Stephanie Tanamas showed that both bone cysts and bone marrow lesions predict the risk of joint replacement in people with knee OA, providing evidence for the importance of bone pathology in disease progression.
- Postdoctoral research fellow Dr Miranda Davies-Tuck published in *Arthritis Research Therapy* the finding that bone marrow lesions are structural changes in the knee that have a fluctuating course which includes resolution. This is associated with improvements in the knee cartilage and thus reduced risk of development of OA. Thus these lesions are potential targets in the prevention of knee OA. This observation was followed with the intriguing finding that higher levels of total serum cholesterol and triglycerides are associated with bone marrow lesions, suggesting a link between vascular disease and OA.
- Studies on the importance of dynamic knee loading on development of bone marrow lesions in OA were published in *Annals of the Rheumatic Diseases*. This was followed by further work showing that dynamic knee loading is also related to cartilage and bone changes in knee OA.
- Trish Berry and Anita Wluka, in a publication in *Rheumatology*, showed that the effect of obesity is not just due to loading of the joint, but that fat mass and muscle mass have different effects on the knee structure. In a further publication in *Arthritis and Rheumatism*, they showed that serum adipokines may provide a non-mechanical link between obesity and joint integrity, by mediating bone and cartilage protein turnover, and subsequent cartilage volume loss.
- Research fellow Dr Changhai Ding examined the associations between non-steroidal anti-inflammatory drugs (NSAIDs) and changes in knee cartilage volume. Comparing users of cyclooxygenase-2 inhibitors with users of conventional NSAIDs, the latter had higher knee cartilage volume loss, supporting the notion of a differential effect on knee structure. This was published in the *American Journal of Medicine* and has significant implications for the management of patients with knee pain.
- Dr Yuanyuan Wang, in a publication in *Rheumatology*, demonstrated the importance of a healthy meniscus in maintaining a healthy joint. She found that meniscal extrusion was associated with subchondral bone marrow lesions, bone cysts and expansion of subchondral bone in OA knees.
- Dr Donna Urquhart and Trish Berry showed that increased fat mass is associated with high levels of low back pain intensity and disability. The work was published in *Spine* and provides a new approach to our understanding of the effect of obesity on back pain and disability.

*Postdoctoral fellow, Dr Fahad Hanna, and visiting research fellow from Sri Lanka, Dr Pushpika Wijethilake, examine the knee magnetic resonance image of a study participant.*



**Postgraduate Students**  
7 PhD Students

**Publications**  
35 Journal Articles