



Editorial



This special edition of “The Knee” focuses on the patellofemoral joint (PFJ). The journal is packed with a variety of high-quality papers covering basic science, clinical work, patella instability and arthritis as well a technical tips relating to the patellofemoral joint.

So where are we with the PFJ in 2019? We have made good steps in our understanding of pathology and treatment for the PFJ, but there is much still to be done. This is the most dynamic of joints with the thickest of cartilage, this robust cartilage reflects the forces imparted by the largest of muscle groups. Anatomic variants and pathologies are frequently co-existent and overlapping [4]. It is not surprising that eighty percent of us will have arthritis of this joint by the time we are eighty years old [3].

We should read Dieppe’s 1994 fundamental statement on the distribution of joint disease and consider our progress. “Disease localization is a mysterious business. Why does eczema affect one part of your skin and psoriasis another? Just as SLE and scleroderma share similar hereditary disposition, autoantibodies and inflammation, so do all forms of osteoarthritic disease ... medial OA of the knee and patellofemoral OA of the knee become distinct entities, as worthy of distinction from each other as SLE and scleroderma.” [1].

Twenty-five years since Dieppe’s statement we have improved our understanding and the care that we give. Patella instability treatment, both with physiotherapy or surgery, can be very effective and often restores people to full activities. Arthroplasty of the patello-femoral joint frequently gives excellent resolution of pain and function. And yet we have, at best, a superficial understanding of the complexities of this challenging joint and we lack the knowledge or tools to reliably and consistently make the best decisions on clinical management of our patients.

An abundance of confusing radiological measures attempt to simplify the pathology to a single number or category. Treatment of problems in this joint relies on an understanding of muscular function, co-ordination, three dimensional anatomic morphology and an ability to synthesise these multiple factors into the overall clinical picture. We must be aware of both the limitations and opportunities provided by physiotherapy and surgery. The work of the surgeon, the physiotherapist and the radiologist coincide closely within treatment of PFJ pathology, yet at present there is a disconnect between these disciplines in both the clinical and academic worlds.

Mechanical abnormalities of the PFJ like patella alta and trochlea dysplasia can contribute to degeneration of this joint and spare the rest of the knee. Distal pole degeneration appears to be related to patella alta but what of the other patterns? Some patella cartilage degenerates centrally, some distally, some superomedial, sometimes the whole patella is affected and of course it may be part of global knee degeneration. Sometimes the trochlea is preserved and the patella degenerative or vice versa.

If you doubt the challenges still ahead of us, consider that 25% of PFJ arthroplasty has been revised at 10 years and the National Joint Registry shows little trend to improvement. Could a better understanding of genetics or the mechanical aetiology help us? We have a growing understanding of the importance of trochlea dysplasia in a subset of patello-femoral OA, but do not understand why others develop PFJ disease who do not have dysplasia. It may be that we can improve patient outcomes if we can identify the subgroup of patients likely to progress to global knee arthritis, and divert them to appropriate treatments. A better understanding of the genetics and mechanics of the disease could be a path to better outcomes.

We should not be too despondent. There is an ever increasing body of knowledge and research to inform us about the PFJ, and there are many important contributions in this issue. The current state of the art is expertly reviewed in a series of articles based on recent presentations to BASK and the BOA at their annual congresses, and it is clear that we do have effective treatments for many of the patients we see. [5] Keehan et al, [6] Tanaka et al and [7] Lee et al all make contributions to improving the radiographic measurement of the PFJ. Without good and appropriate outcomes we would fail to progress our clinical understanding and [8] Smith et al’s progress with the Norwich Patella Instability Score is to be commended. The clinical research of [9] Greuel et al, [10] Yousef et al, [11] Vaidya et al, [12] Rammohan R et al and [13] Melnic et al all advance our knowledge of how best to treat our patients, and the rich variety and quality of basic science demonstrated in this issue, by [14] Dan et al, [15] Farahmand et al, [16] Takabayashi et al, [17]Zhang et al and [18] Parke et al are essential if we are to understand PFJ diseases better and innovate effectively.

So how are we going to make future progress in PFJ research? We propose that a new approach, focused on diversity of thought and collaborative working across professions, is the approach that is most likely to achieve the major change needed to improve treatment for PFJ pathology. Contemporary literature is awash with material promoting the value of diverse thinking and experience in producing innovative and efficient solutions to the world's problems, and scientific communities and funders are increasingly waking up to the value that can be provided by cross-disciplinary research. It is time that the multiple professions who consider and manage PFJ pathology, and the scientists with expertise to support these ventures, all work collaboratively towards new solutions.

This special edition of "The Knee" coincides with the launch of the British Patellofemoral Society. This not a surgical society, the membership is open to all, including surgeons, physiotherapists, radiologists, engineers, clinical trialists, sports and emergency physicians. The society aims to bring together all interested parties with the objective of finding new ways of looking at challenges, developing treatment resources and directing future research. The society hopes to provide support for researchers, resources for healthcare practitioners and information for patients. The first meeting of the society is in January 2020 and further details of the meeting can be found in the journal.

References

- [1] Dieppe P, Kirwan J. The localization of osteoarthritis. *Br J Rheumatol* 1994;33:201–3.
- [2] Liow MH, Goh GS, Tay DK, Chia SL, Lo NN, Yeo SJ. Obesity and the absence of trochlear dysplasia increase the risk of revision in patellofemoral arthroplasty. *Knee* 2016;23:331–7.
- [3] Noble J, Hamblen DL. The pathology of the degenerate meniscus lesion. *J Bone Joint Surg Br* 1975;57:180–6.
- [4] Steensen RN, Bentley JC, Trinh TQ, Backes JR, Wiltfong RE. The prevalence and combined prevalences of anatomic factors associated with recurrent patellar dislocation: a magnetic resonance imaging study. *Am J Sports Med* 2015;43:921–7.
- [5] Keehan Robert, Gill Amarit, Smith Lindsay, Ahmad Riaz, Eldridge Jonathan. Mid inter-epicondyle trochlea intersection (MIELTI): Proposal of a new index for identifying the deepest part of the trochlea. *Knee* 2019;26:1204–9.
- [6] Tanaka Miho J, D'Amore Taylor, Elias John J, Thawait Gaurav, Demehri Shadpour, Cosgarea Andrew J. Anteroposterior distance between the tibial tuberosity and trochlear groove in patients with patellar instability. *Knee* 2019;26:1278–85.
- [7] Nha KyungWook, Nam Young Jun, Shin Myung Jin, Sun Seung Deok, Park Jae Young, Debnath Rajib, et al. Referencing the trochlear groove based on three-dimensional computed tomography imaging improves the reliability of the measurement of the tibial tuberosity–trochlear groove distance in patients with higher grades of trochlea dysplasia. *Knee* 2019;26:1429–36.
- [8] Smitha TO, Choudhury A, Navratil R, Hing CB. Psychometric properties of the Norwich Patellar Instability Score in people with recurrent patellar dislocation. *Knee* 2019;26:1192–7.
- [9] Greuel Henrike, Lee Herrington, Liu Anmin, Jones Richard K. Influence of the Powers™ strap on pain and lower limb biomechanics in individuals with patellofemoral pain. *Knee* 2019;26:1210–9.
- [10] Yousef Mohamed A. Traumatic injury of the knee extensor mechanism in skeletally immature patients: Outcome and classification. *Knee* 2019;26:1250–61.
- [11] Manghwani Jitesh, Vaidya Shrinand V, Patel Hiren, Vaidya Chintan S. Does total contact of the patella with the femoral trochlea during no thumb test significantly reduce anterior knee pain? *Knee* 2019;26:1338–47.
- [12] Rammohan R, Gupta Shreekant, Lee Paul YF, Chandratreya Amit. The midterm results of a cohort study of patellofemoral arthroplasty from a non-designer centre using an asymmetric trochlear prosthesis. *Knee* 2019;26:1348–53.
- [13] Melnic Christopher M, Kazarian Erick R, Dwyer Maureen K, Domingo-Johnson EL, Freiberg Andrew A, Bedair Hany S. Early post-operative opioid consumption: A comparison between medial unicompartmental, patellofemoral, and total knee arthroplasty. *Knee* 2019;26:1360–3.
- [14] Dan Michael J, Oliver Rema A, Crowley James D, Lovric Vedran, Parr William CH, Broe David, et al. The effect of surgery on patellar tendinopathy: Novel use of MRI questions the exploitability of the rat collagenase model to humans. *Knee* 2019;26:1182–91.
- [15] Akbar Mohammad, Farahmand Farzam, Arjmand Navid. Mechanical characterization of the ligaments in subject-specific models of the patellofemoral joint using in vivo laxity tests. *Knee* 2019;26:1220–33.
- [16] Tomoya Takabayashi, Mutsuaki Edama, Takuma Inai, Yuta Tokunaga, Masayoshi Kubo. A mathematical modelling study investigating the influence of knee joint flexion angle and extension moment on patellofemoral joint reaction force and stress. *Knee* 2019;26:1323–9.
- [17] Wang Dingyu, Shen Zhongcheng, Dong Jiang, Xu Li, Fang Xuan, Leng Huijie, et al. Qualitative and quantitative analysis of patellar vascular anatomy by novel three-dimensional micro-computed-tomography: Implications for total knee arthroplasty. *Knee* 2019;26:1330–7.
- [18] Parke Elizabeth A, Nakasone Cass K, Andrews Samantha N, Wright Anne R, Stickley Christopher D. The effect of patellar thickness on gait biomechanics following total knee arthroplasty. *Knee* 2019;26:1354–9.

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