It all goes in cycles, then and now, stepping back to the future...

Reflection of an orthopaedic surgeon and teacher after 50 years of practice

Roland Peter Jakob

“Each generation feels called upon to reform the world.” —Albert Camus, French author and philosopher, 1913–1960

Although we have observed how medicine has been continuously making progress it may today, at the end of an individual's professional career be worthwhile and not in vain to allow you a break and reflect about the past, looking back to what we practised in our field of orthopaedic surgery and specifically sport-orthopaedics 30–50 years ago, especially in my own main topic of the ‘Knee’. In the 1970s and 1980s of the last century individual discoveries based on observations were rapidly taken to the clinic: some of them have survived to time, some have been bad for our patients. The motive for such a reflection is the desire to better understand what practices have kept validity and to ask whether every advancement in the broad field of orthopaedic surgery has truly been justified in terms of true patient benefits given the cost of the intervention. I will try to discuss a few examples to demonstrate what has given rise in the past to new discoveries of anatomy fostering and justifying so-called ‘new techniques of knee surgery’.

LATERAL REPAIRS OVER THE LAST 50 YEARS: REDISCOVERY OF AN OLD, BUT NOT FORGOTTEN PRINCIPLE

One of these journeys, some of us remember, started during the years 1960–1975 with extra-articular techniques according to Lemaire and McIntosh for stabilisation of a knee instability due to a torn anterior cruciate ligament (ACL) after fresh injury or chronic laxity. I happened to work at that time (1973–1975) as a Fellow in Toronto and D McIntosh taught me the Pivot Shift Test and I looked at his surgery and later, I also met Art Ellison and as well Ron Losee—both had been practising other techniques on the lateral side to get control of the subluxating lateral compartment in which the two convex surfaces had become out of control. And later, J Andrews, who was as well convinced that the lateral side presented the main problem, practised his extra-articular technique. A revolutionary discovery, that stimulated several of many studies focused on the instability phenomenon. And for us it led to observational data resulting in the description of another phenomenon in the lateral compartment, the Reversed Pivot Shift due to posterolateral instability (1981). This, call it early period, was followed in 1980 by combined open (and shortly after by arthroscopic) intra-articular and open extra-articular reconstruction techniques to then move after 1990 to exclusive intra-articular surgery, once arthroscopy had entered all of our operating room (OR) theatres. While for some of us Europeans it was clear that in severe chronic laxities some combination of both was needed, most of the surgeons worldwide omitted the extra-articular part during the following period. Was it mainly the arthroscope, for example, the pressure to do all arthroscopically that threw the extra-articular enforcement overboard? Things then remained unchanged for 25 years and only during the past 5–10 years, new attention and science was gained and experience gathered that it might be worthwhile to combine the two principles. The reasons for this could also be that somewhat ‘weaker’ ACL graft

materials with often inappropriate placement had routinely been used regardless of the severity and degree of laxity, age and activity demands of patients. Seemingly little consideration was given to what high physical demands would be placed on the reconstructed knee. After 2015, the larger sports medicine community slowly came back to a combination of intra-articular and extra-articular again, mainly for those chronic and severe instabilities. So, it seems that not all which was done was useless... Today, we are in the cycle back again to the 1990s regarding the discussed standards of surgical treatment of a chronic ACL instability. This is also reflected in the number of scientific publications on this topic. (R Martin, J Nyland and R P Jakob take a careful bibliometric look at this issue in this volume of JISAKOS.)

PATELLAR TENDON BONE AUTOGRAFT OVER THE LAST 50 YEARS: ARE WE COMING AGAIN BACK TO IT?

A similar cycle, although less prominent, could be observed with the graft material chosen for the ACL reconstruction, the graft choice remaining an open question since 40 years. Patellar tendon bone (PTB) was described after the 1950s and with, as alternative, the quadriceps tendon became gold standard until the mid-1990s when hamstring tendon grafts got trendy because of fewer donor site problems, smaller incisions needed and presumably equally good results independent of the severity of instability, acute or chronic a lesion, sex and age of the patient, life and sports activity demands, and so forth. Thus, this soon became the standard of treatment and was used as single or double or quadruple transplant and introduced and fixed in a ‘one or double bundle’ technique. Certainly, one method alone allowed a more efficient surgical teaching for residents with always shorter time available for. Any resulting loss of flexion force of the sportsman's knee was thought to be negligible and some papers even stated regrowth of the tendon(s). But did the saved OR time and technical easiness justify such a one-dimensional way of management for all patients? What about the often-mentioned decreased flexion power and synergistic muscle loss? What about a growing concern of secondary loosening of the hamstring graft mainly in young male athletes? Only now, one realises and admits that this pretty uniform change to hamstrings may have been a bit short-sighted in that the strength of the hamstring tendon material may not be

Correspondence to Professor Roland Peter Jakob, Orthopedics, University of Bern, Bern 3012, Switzerland; jakobroland@gmx.ch

able to withstand the test of time, especially for young male and high-demand athletes. Today, there seems to be a more open-minded attitude, representing a swing back to a more differentiated policy of specific surgical indication where there is weighing of pros and cons for a given graft choice dependent on the needs and the age and sex of the patient and slowly this philosophy is replacing the uniform policy of 'hamstrings only'. At the ISAKOS Congress 2019 in Cancun, an ACL Panel concluded that PTB was preferable when the demands of younger athletes put on their reconstructed knees were high.

Today, for 5 years, we know thanks to Smigielski and Siebold that the ACL is not round like a quadruple hamstring graft. By just observing their pictures, one realises that the PTB graft is indeed 'ribbon-like'. For decades we have known that bone-to-bone healing is more secure than 'tendon in a hole' healing and when using aperture fixation on the femoral side, we are even able to orient the bone block in the correct way that 'the ribbon' takes off as far posterior as possible. When using the old Chablat PTB technique with introduction of the tibial graft from proximal to distal through the femoral tunnel we are able to wedge the graft in an aperture position which provides inherent natural stability, and it now needs very little to put a suture around a screw or a button at tunnel entry to secure the graft. Therefore, would it not be better to admit the trend and to invest a bit more time for the retrieval of a PTB graft, using this graft source more frequently? Although PTB graft use may be a bit too much in a woman aged 35 years or older with a skiing injury, it certainly would seem to be the more appropriate graft option for a 20-year-old male soccer player. Is the perception that PTB use is 'more difficult' and 'more time consuming' a reason to change to a 'presumably simpler' technique if it is more likely to provide better long-term stability?

MENISCAL REPAIR TECHNIQUES: ARE THE MODERN ALL-INSIDE TECHNIQUES EQUALLY GOOD OR BETTER THAN THE CLASSIC INSIDE-OUT AND OUTSIDE-IN SUTURING TECHNIQUES?

In the 1970s, meniscal suturing was developed and allowed to save more freshly torn menisci. While this was initially, up to about 2000, a semiopen and arthroscopic *inside-out* or *outside-in* technique making medial and lateral counterincisions necessary with occasional saphenous nerve and rare

vascular problems, this was succeeded by the development of so-called easier, straightforward and mainly less time-consuming *all-inside* techniques and they were heavily pushed by industry. Today, many surgeons only practise one technique, some a combination of them to 'throw in' a couple of anchors in even short tears of 1 cm length for which the need of fixation would still have to be demonstrated. Again, the OR time factor plays a role but is this sufficiently valid? Each surgeon's experience with his or her own failures of fixation and complications may become arguments to decide for one or the other technique. The benefit of a shorter OR time may be nullified by a higher price of the actual technical gadgets and implants with the more modern techniques. Lost plastic or PEEK anchors may give rise to painful cyst formations, visible on MRI, and failure of complete healing may be more frequently observed with modern all-inside techniques than with the classic, more time-consuming and meticulous suturing methods. This is not a true cycle yet, but with careful consideration one may predict a return to the classic suture techniques.

Maybe a combination of the classical principles and modern techniques will be the future, a way which many of us have followed in view of the experiences collected over time. Financial restrictions of our surrounding health systems shall influence decisions of that kind as well. The message could be to integrate new techniques without throwing overboard the old established methods.

OSTEOTOMY: IS IT SLOWLY GETTING OFF THE GROUND?

Today's surgical osteotomy techniques are more precise than what we learnt initially from Coventry and Debeyre. Fixation using plate fixators is more secure and many young surgeons treat active patients with unicompartmental knee osteoarthritis who are 30–40 years of age after meniscal and ligament and cartilage injuries and previous surgeries. These patients would benefit from being offered a surgical procedure that is more durable, allowing higher range of motion than an artificial joint, yet still giving them satisfactory function and reduced knee pain. Without touching on other arguments to decide, many younger surgeons might be on theoretical grounds convinced of osteotomy indications and might have an interest to benefit from the assistance by an

experienced, older colleague to use the skills and safety to perform a correct and good osteotomy including the crucial step of preoperative planning. Has osteotomy become a lost art also because their chiefs had stopped doing them, being more interested in artificial joints—a tendency also pushed for financial purposes by our hospitals? Yet we know all too well that 25% of the total knee arthroplasty patients are not completely happy and that a growing burden of revision procedures are on the horizon of many western health-care systems. There may exist a growing number of patients who desire a combination of preservation of their own tissues and lifestyle changes rather than early surrender to knee replacement with synthetic materials. Is it a specific health system like in South Korea which only allows implantation of artificial joints after 65 years of age that forces the orthopaedic community to perform osteotomies on a greater scale? Or, is there any hope that our young colleagues and surgeons might come back to invest more time again in learning to do a good osteotomy, planning included, and that referring doctors, practitioners, rheumatologists and physiatrists and physiotherapists might cooperate in this direction as well? Among young surgeons in Great Britain and Germany, we observe an increasing interest thanks to the pertinent teaching of some of us who have not lost enthusiasm for this promising field of surgical orthoregeneration presenting a counterweight against an over-riding arthroplasty policy! But, the fulfilment of that cycle still must be hoped for. Today, however, there appears to be a detectable trend for renewed interest in this topic!

CONCLUSION

'*Inizio e seguito*' (Italian), '*Recul*' (French) and '*Beginning and Follow-up*' are terms of 'Principles in Medical Epidemiology' and this also needs to be looked at retrospectively, back to the time period in which they were developed, with the aim to study if those stood the test of time and kept a certain merit. If yes, it would be a pity if they would become forgotten. But to be able to observe the discarding tendency of established principles over a certain time to then be followed years later by tendencies of regaining interest in the same subject and to give life to a true new cycle to be born you need to be given the only and single

chance—that is to become old enough and still keeping an interest in the field you dealt with during your professional career. Cycles and tendencies of disappearing and regaining interest in surgical treatments in orthopaedics are usually of 25–30 years duration, and have, as to our knowledge, not been recognised and addressed as such. In this text we present four examples of this phenomenon from the inexact science of orthopaedic or sports orthopaedic surgery. Other examples come to mind also, with the thought that medical reasons for these phenomena may not be the sole reason behind their emergence.

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