British Orthopaedic Association

Robert Jones Medal and Association Prize

2026 Winner: Paul Y F Lee FRCS(T&O)

Recovery in the Age of Intelligence:

Why Humility May Be the Surgeon's Most Powerful Tool

Introduction

When the final instrument count is called and the sign-out is complete, there's a brief pause at the end of a long orthopaedic list — a moment where the intensity lifts just enough to think clearly again. In that space, I often reflect not just on the technical execution, but on everything that truly shapes outcomes: the decisions made under pressure, the communication that held the team together, the moments of uncertainty, and the judgement calls that can't be taught in textbooks. It's a reminder that surgery is never just the operation — it's the sum of our choices, and the humility to recognise what we don't yet know.

Intelligence and Changing Practice

This reflection grows sharper now, because in recent years another presence has entered our clinical world. Not a person, but a kind of intelligence: data-driven, pattern-recognising, always awake, sometimes unsettling, often illuminating. Intelligent imaging that maps tissue health beyond what the human eye can see. Digital systems that track a patient's recovery hour by hour. Predictive analytics that expose risks we might not have considered. Biomechanical tools that analyse movement more precisely than any observer could.[1,2]

These technologies do not replace the surgeon, but they reshape the landscape in which we work. They change what we see, how we decide, and what our decisions reveal about us. Precision has widened. Uncertainty has narrowed. And yet the paradox is clear: as intelligence grows, humility becomes more important, not less.

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Humility is what keeps us anchored when information rushes ahead of understanding.
Humility is what prevents harm when the clarity of data tempts us towards overconfidence.
Humility is what transforms lives when technology alone cannot.

Sir Robert Jones, after whom this medal is named, understood something profound about this balance long before artificial intelligence existed. He was a pioneer of systems, structure, and scientific method in orthopaedics, but he was also a doctor who saw patients first as people. He valued collaboration, recognised the limits of any single viewpoint, and never let innovation eclipse humanity.[3] His legacy frames the challenge of our era: how to use expanding intelligence without losing the qualities that make us worthy of using it.

Sir Robert Jones and the Mindset of Early Innovation

Long before the language of "artificial intelligence" entered orthopaedics, our specialty had already lived through a moment like this, when a new tool suddenly changed what a surgeon could see, and therefore changed what a surgeon could know.

Sir Robert Jones did not watch that revolution from a distance. Within months of the discovery of X-rays, Jones installed a rudimentary radiography machine in his Liverpool clinic.[9] Not as a novelty, but as a clinical necessity, an early recognition that better vision reshapes better judgement.

Those instincts matter now because it reflects the mindset our era demands: curiosity without arrogance, and progress rooted in evidence rather than personal certainty. X-rays transformed what surgeons could see in diagnosis; intelligent imaging and analytics are now transforming what we can interpret, not only before surgery, but in the unpredictable human story of recovery that follows.

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The New Landscape of Orthopaedic Care

What has changed most is not simply what we can do in theatre, but what we can now see after theatre. Recovery is no longer a black box revisited at six weeks and twelve weeks, built from brief snapshots and imperfect recall. Increasingly, recovery is visible, recorded through imaging, movement analytics, patient-reported outcomes, and patterns drawn from thousands of comparable pathways. This is the shift now shaping orthopaedic practice. This is the new landscape of orthopaedic care: surgery as the beginning of a monitored journey rather than the end of an isolated intervention.

For surgeons, that visibility creates a new kind of responsibility. When a patient's progress can be tracked in fine detail, our reassurance must be earned rather than assumed. When variation is detected early, complacency has fewer places to hide. The intelligent age therefore demands something deeper than technical confidence: it demands humility — the willingness to pause when the data does not fit the patient, to listen when the patient does not fit the data. In this landscape, humility becomes not only a personal virtue, but a practical safeguard that keeps intelligence aligned with care.

Humility and the Consultant's Perspective

As a long-practising consultant, I have witnessed this shift more vividly each year. Early in my career, surgery felt more enclosed — the surgeon's eye, the surgeon's hand, the surgeon's interpretation. Data supported us, but did not surround us. Patterns were learned slowly, through repetition. Insight arrived at the pace of years.

Today, intelligence can reveal in seconds what once took decades to notice. It can illuminate subtleties in cartilage behaviour during gait, deviations in joint loading invisible to clinical examination, and tissue changes detectable only with advanced analytical techniques. It can

compare a patient's pathway to thousands of others instantly. It can show us where we were unknowingly biased, or where our "usual" approach may not be the safest.[1-4]

Although much of my academic work has centred on biomechanics, regenerative science, and the engineering principles that shape joint preservation, I chose not to focus this essay on any one of those areas. It would have been straightforward to write about alignment algorithms, fracture healing pathways, or the science of movement, fields to which I have dedicated many years of research. Yet these subjects, valuable as they are, speak mainly to specialists. They represent advances in knowledge, but not necessarily advances in wisdom.

Humility, by contrast, belongs to everyone in our profession. It shapes every consultation, every multidisciplinary discussion, every moment of uncertainty in theatre, every decision where information is abundant but clarity is not. And in the age of intelligence, humility has become even more critical: it determines how safely we interpret data, how responsibly we use technology, and how openly we communicate with patients who now arrive armed with information that was once inaccessible.[4]

For a medal bearing the name of Sir Robert Jones, it felt more fitting to reflect on the virtue that underpins all innovation, rather than the innovations themselves.

Insight, Error and Human Complexity

A surgeon who lacks humility can use artificial intelligence in ways that cause harm:
by over-trusting models,
by neglecting context,
by failing to question outputs that do not fit the patient,
by losing sight of human complexity.[6]

Humility is the safeguard against these errors. It is not sentiment; it is discipline.

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For me, humility has been shaped most deeply by the long arc of consultant practice. A trainee sees moments; a consultant sees consequences. A trainee witnesses the operation; a consultant witnesses the years that follow. That perspective teaches a truth no textbook articulates: technical success does not guarantee human recovery. And human recovery is where the true weight of orthopaedic practice lies.

Some of the most powerful lessons come not from triumphs, but from quiet corrections:
the scrub nurse who notices a sterility concern,
the trainee who hesitates because something "just doesn't feel right,"
the patient who explains their priorities differently from what we assumed.

These moments shape humility far more than complicated theory. They remind us that insight is shared, not owned.

Insight itself is a richer concept than error-correction. In regulation, insight involves recognising error, understanding its causes, and preventing recurrence.[7] But in the era of artificial intelligence, this definition expands. Machines can correct error; however, they are not made to reflect. They cannot feel the discomfort that prompts moral growth. They cannot distinguish between what is measurable and what is meaningful. They cannot decide when a patient's story matters more than a probability.

AI cannot possess humility because humility is a human virtue.

Artificial intelligence cannot forget; humans can.
Artificial intelligence cannot forgive; humans can.
Artificial intelligence cannot choose restraint; humans must.

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Forgetfulness, often seen as a flaw, is one of the strange blessings of human intelligence. Machines remember everything unless told otherwise. Humans forget selectively, and through this forgetting, compassion becomes possible. Humility grows in that space where memory softens enough for empathy, yet remains strong enough for learning.

Recovery, Communication and Shared Decision-Making

Digital systems can now trace recovery more closely than ever, mapping sleep, gait, swelling, loading and activity. But recovery remains profoundly human: influenced by fear, expectations, culture, relationships, work, fatigue and belief.[7,10] No system can model these completely. And no algorithm can feel the moment a patient regains confidence, or loses it.

Patients in the intelligent age come with more knowledge than ever before. Sometimes this knowledge is accurate; often it is incomplete; occasionally it is persuasive but misleading. But the relationship has changed. Patients now participate with a new confidence, comparing our explanations not only with online information but sometimes with algorithmic interpretations of their own scans.

This does not diminish the surgeon's role; it heightens the need for honest, humble communication.[5]

Humility helps us avoid dismissing their research or overwhelming them with ours.

Humility prevents us from hiding uncertainty behind complexity.

Humility helps us clarify what technology reveals and what it does not.

Because technology measures; it does not understand.

Technology predicts; it does not judge.

Technology informs; it does not decide.

Technology accelerates; it does not empathise.

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Humility Across Generations

The future of safe orthopaedic practice lies not in simply adopting intelligent systems, but in developing the humility to use them wisely, acknowledging both their power and their limits. In every environment I have worked, humility has remained the universal language of safe care. Culture, resources and regulation may differ, but the human need for dignity, clarity and respect does not.

Trainees today face challenges I never did. They learn in a world where simulation, modelling, dashboards and real-time feedback shape their understanding. Their anxieties differ, their pressures are more visible, and their performance more scrutinised. They risk believing they must match the perfection of a system. Consultants risk believing our experience is beyond challenge.

Humility bridges these generations.
Consultants need humility to recognise that our experience gains new depth when viewed through the lens of modern intelligence.
Trainees need humility to recognise that judgement still grows through lived experience.
Both need humility to decide when technology must be questioned — and when it must be trusted.

Conclusion

Preventing harm requires empathy, listening, questioning and awareness of limitation. Transforming lives requires hope, clarity, skill and courage. Humility sits at the centre of both.

At the end of many lists, after the final checks are complete and the theatre shifts into its next rhythm, I am reminded that intelligence alone cannot keep patients safe. It cannot choose compassion. It cannot correct arrogance. It cannot replace the human capacity to recognise when we are wrong, or when another voice may see more clearly than our own.

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Sir Robert Jones helped build our specialty not only through technical innovation but through a profound respect for patients and colleagues. He understood that a surgeon's authority does not come from knowledge alone, but from character and from the ability to learn, to listen, to collaborate, and to remain grounded in service.[3] His legacy reminds us that humility is not the opposite of expertise; it is the foundation that allows expertise to benefit others.

Patients can forgive technical limitations more easily than they forgive arrogance or opacity. Sir William Osler once wrote: "Acquire the art of detachment, the virtue of method, and the quality of thoroughness, but above all the grace of humility."[8] His words feel almost prophetic in the intelligent age.

For me, humility took shape not in dramatic moments but in slow revelations, patterns seen only after years of practice. The elderly patient whose anxiety surfaced once the door was almost closed. The young athlete whose progress made no statistical sense but perfect human sense. The family who trusted everything except a single ambiguous phrase. The trainee who needed reassurance more than instruction.

These experiences teach a lesson no data model can provide: human recovery is not linear, predictable, or machine-like. It is emotional, relational, fallible and beautifully unpredictable.

In the age of intelligence, we must remember that our most powerful tool is not the data we hold, the models we use or the predictions we receive but it is the humility that guides how we use them.

Humility keeps patients safe.
Humility keeps our profession human.
Humility turns intelligence into wisdom.

And that is why, in this new era of expanding capability with artificial intelligence, humility may now be the surgeon's most powerful tool of all.

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