EDITORIAL

Nepal Orthopedic Association Journal
NOAJ

Bridging General and Subspecialty Orthopedics: How do we Strike a Balance?

Bibek Banskota, *Editor-in-Chief*

Introduction

https://doi.org/10.59173/noaj.20261203a

Our forefathers in Orthopedics to whom we owe our own knowledge and opportunities, had the arduous task of being a generalist while breaking boundaries to create the subspecialities that we know today. With advances in knowledge, technology, and opportunities, the orthopedic discipline today is a constellation of subspecialities including trauma, spine, arthroplasty, arthroscopy, pediatrics, hand and upper limb, foot and ankle, oncology, and limb reconstruction. The West has been at the forefront of this proliferation with other parts of the world quickly following the same trends. In the United States, the proportion of board candidates with fellowship training rose from 76% to 90% between 2003 and 2013, and 78% of their procedures fell within their fellowship area.[1] Accreditation of those fellowships, however, varies widely.[2] Volume–outcome relationships for operations such as total knee replacement offer a clinical rationale,[3] and competency-based curricula show that training can be organized around demonstrated ability rather than time served.[4] Such models grew within dense workforces and mature regulation; they do not transfer automatically to Nepal, as India's own debate illustrates.[5]

Postgraduate orthopaedic training in Nepal has expanded across several universities and academies, and arthroplasty, endoscopic surgery, spine, pediatric and reconstructive services now operate in tertiary and private hospitals, most visibly in the Kathmandu Valley. What the country lacks is a count. No comprehensive national dataset records how many orthopaedic surgeons practice, where, or with what subspecialty training. The most direct Nepal-specific evidence remains a 2021 survey of 93 surgeons:[6] 45.7% reported fellowship training, mean duration was 6.9 months, India was the commonest destination (53.5%), and endoscopic surgery, spine and arthroplasty were the most frequent choices. A cross-sectional electronic survey describes a connected subgroup, not the national workforce, but it signals that fellowship has become an expectation.

Following residency, fellowships can play an important role in exposure to complex procedures, subspecialty mentorship, and focused research. However, fellowship is loosely used to cover both structured posts with case logs and assessment and observerships in which are not 'hands-on'. Duration, curriculum, supervision, operative exposure, certification and funding vary; almost all respondents recommended paid or sponsored posts.[6] Applicants elsewhere rank operative exposure and faculty reputation highest;[7] an informal attachment guarantees neither. Professional bodies, universities, teaching hospitals and the Nepal Medical Council should jointly set minimum standards, distinguish fellowship from observership and assess competence by outcome rather than attendance.[4] Standardization need not mean uniformity; it means that a title carries verifiable meaning and that fellows retain the general competence every orthopaedic surgeon owes a trauma patient at night.

The big unanswered question is "what the subspecialty workforce is for?" Fellowship choices respond to employment, remuneration, equipment, prestige, lifestyle and urban private-sector demand. These are legitimate signals, but market demand is not population need. Nepal's musculoskeletal burden is dominated by injury: police-recorded road traffic accidents rose from 20,640 to 28,692 between 2020/21 and 2024/25,[8] at an estimated cost of 1.52% of gross national product;[9] globally, road injury is the leading killer of people aged 5–29 years.[10] At one tertiary hospital in Chitwan, 63% of 27,893 trauma presentations involved fractures and two-thirds of patients came from outside the district.[11] A national household survey placed disabling extremity conditions among the largest sources of unmet surgical need.[12] Ageing and osteoarthritis,[13] rehabilitation needs led by musculoskeletal disorders,[14] congenital and neglected deformities, infection and late presentation from remote districts[15] complete the picture. Should the workforce follow the market or be deliberately aligned with disease burden? Neither pure answer works. A market-only model concentrates expertise where paying patients are; a plan that ignores incentives creates posts no one fills. The realistic path is to steer, using accreditation, funded fellowships and public-sector posts to build trauma, paediatric and reconstructive capacity while letting demand-led services grow.

Copyright © 2026 Nepal Orthopedic Association Journal. Published by The Nepal Orthopedic Association. This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (CC BY-NC-ND 4.0), which permits unrestricted downloading and sharing of the work provided the original author and source are properly cited. The work may not be modified or used for commercial purposes.

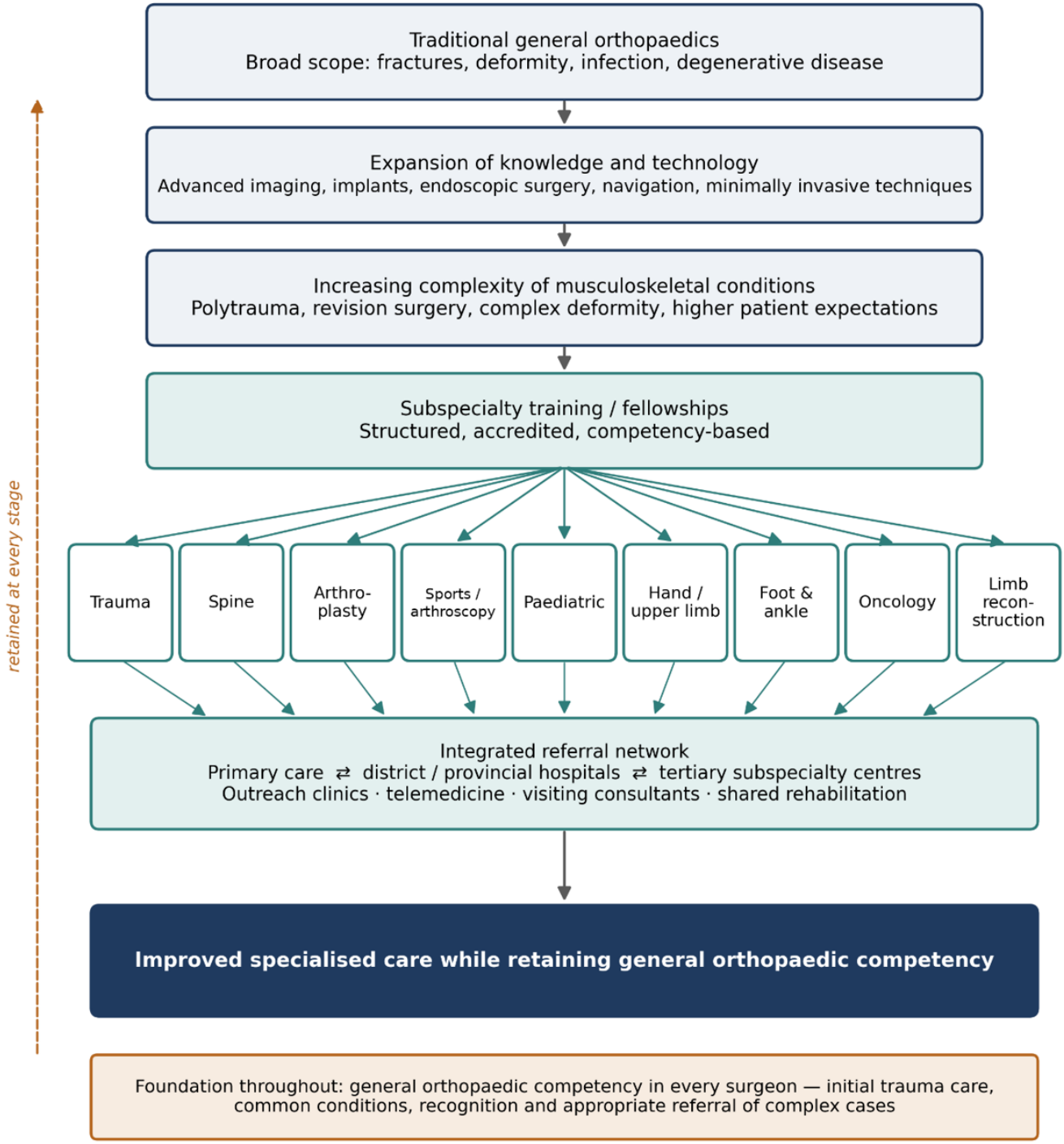


Figure 1 From general orthopaedics to a networked subspecialty system. Conceptual pathway (original figure). Four stacked stages run from traditional general orthopaedics, through expansion of knowledge and technology (advanced imaging, implants, endoscopic/ arthroscopic surgery, navigation, minimally invasive techniques) and increasing clinical complexity (polytrauma, revision surgery, complex deformity, rising patient expectations), to structured, accredited, competency-based subspecialty training. Fellowship training then branches into nine subspecialty domains: trauma, spine, arthroplasty/adult reconstruction, endoscopic surgery, paediatric orthopaedics, hand and upper limb, foot and ankle, musculoskeletal oncology and limb reconstruction. All branches converge on an integrated referral network that links primary care, district and provincial hospitals and tertiary subspecialty centres through outreach clinics, telemedicine, visiting consultants and shared rehabilitation. The end point is improved specialised care while general orthopaedic competency is retained. A foundation bar and a dashed vertical arrow indicate that general orthopaedic competency (initial trauma care, management of common conditions, and recognition and appropriate referral of complex cases) is preserved at every stage rather than replaced.

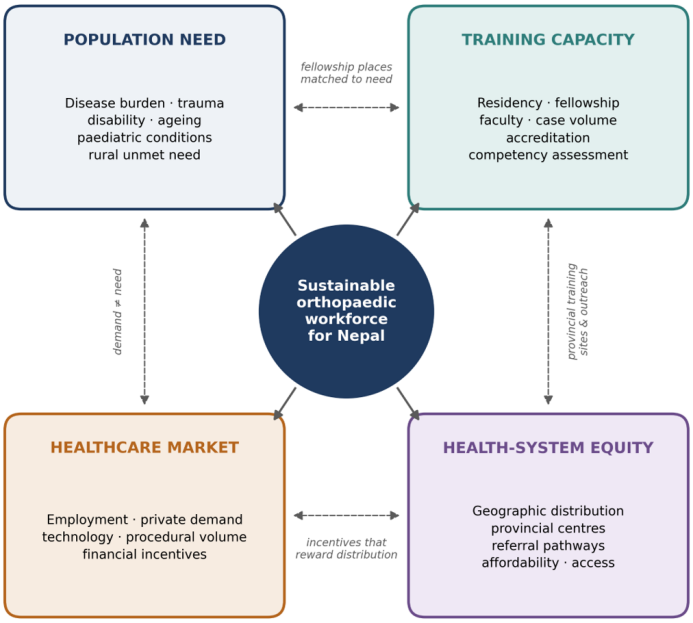


Figure 2 **Aligning orthopaedic subspecialisation with Nepal's needs. Conceptual framework (original figure) of four interacting domains surrounding a central goal, a sustainable orthopaedic workforce for Nepal. Population Need (disease burden, trauma, disability, ageing, paediatric conditions, rural unmet need); Training Capacity (residency, fellowship, faculty, case volume, accreditation, competency assessment); Healthcare Market (employment, private-sector demand, technology, procedural volume, financial incentives); and Health-System Equity (geographic distribution, provincial centres, referral pathways, affordability, access). Solid bidirectional arrows link each domain to the centre; dashed arrows show key pairwise interactions: fellowship places matched to need (Population Need–Training Capacity), incentives that reward distribution (Healthcare Market–Health-System Equity), the gap between demand and need (Population Need–Healthcare Market), and provincial training sites and outreach (Training Capacity–Health-System Equity). The framework proposes that the optimal system emerges when all four domains are aligned, and that dominance of any single domain, such as market demand alone, produces imbalance.**

If subspecialists remain concentrated in Kathmandu, subspecialities could widen inequity; the Lancet Commission on Global Surgery framed access as a property of systems, not specialist headcounts.[16] Nepal already has workable alternatives: elastic nailing of pediatric forearm fractures without fluoroscopy in a far-western district,[17] short courses that improved general orthopaedic surgeons' competence in soft-tissue coverage,[18] and training of peripheral health workers in primary fracture care.[19] Together they suggest a "house of orthopaedic" model. General competence is the foundation; subspecialists occupy the upper floors; referral pathways, outreach, telemedicine and visiting consultants form the staircase; rehabilitation runs through every level. Fragmentation, in which ordinary knee pain is passed between three clinics, is a real risk; equally, revision arthroplasty or deformity correction cannot be mastered in passing.[3]

Subspecialization also offers the best opportunity to build research through registries, multicenter cohorts, trials, health-economic and geographic access studies, and national guidelines. Fellowships should produce clinician-scientists, educators and leaders, not only proceduralists.
Seven priorities follow: 1) Map the workforce by subspecialty and province; 2) Measure musculoskeletal burden and unmet surgical need; 3) Establish competency-based fellowship standards with transparent accreditation; 4) Align fellowship capacity with national and provincial need through sustainable scholarships; 5) Strengthen provincial centers and referral networks so that subspecialists are distributed rather than clustered; 6) Preserve general competence through residency and continuing education; and 7) Embed registries and outcome measurement in every fellowship.
Even in the USA, shortages in the orthopaedic surgery workforce, mainly in nonmetropolitan areas, was anticipated in one study looking at projections from 2024 to 2037.[20,21]

Nepal need not choose between general orthopaedics and subspecialisation. It needs a coordinated workforce where subspecialisation is purposeful, evidence-based, competency-driven, geographically responsive and aligned with population need. The future of orthopaedics in Nepal should be defined not by subspecialist numbers, but by how effectively expertise reaches the people and conditions that need it.

References

1. Horst PK, Choo K, Bharucha N, Vail TP. Graduates of orthopaedic residency training are increasingly subspecialized: a review of the American Board of Orthopaedic Surgery Part II database. J Bone Joint Surg Am. 2015;97(10):869-75. https://doi.org/10.2106/JBJS.N.00995

2. Daniels AH, Grabel Z, DiGiovanni CW. ACGME accreditation of orthopaedic surgery subspecialty fellowship training programs. J Bone Joint Surg Am. 2014;96(11):e94. https://doi.org/10.2106/JBJS.M.01340

3. Katz JN, Barrett J, Mahomed NN, Baron JA, Wright RJ, Losina E. Association between hospital and surgeon procedure volume and the outcomes of total knee replacement. J Bone Joint Surg Am. 2004;86(9):1909-16. https://doi.org/10.2106/00004623-200409000-00008

4. Ferguson PC, Kraemer W, Nousiainen M, Safir O, Sonnadara R, Alman B, et al. Three-year experience with an innovative, modular competency-based curriculum for orthopaedic training. J Bone Joint Surg Am. 2013;95(21):e166. https://doi.org/10.2106/JBJS.M.00314

5. Dougherty PJ, Sethi A, Jain AK. Orthopaedic surgery education in India. Clin Orthop Relat Res. 2014;472(2):410-4. https://doi.org/10.1007/s11999-013-3391-y

6. Mishra BN, Poudel RR, Challa S. Orthopedic sub-specialization: need or hype? Opinion from Nepalese orthopedic surgeons. J Nepal Health Res Counc. 2021;18(4):692-7. https://doi.org/10.33314/jnhrc.v18i4.3159

7. Oser FJ, Grimsley BM, Swinford AJ, Brown SM, Mulcahey MK. Variety and complexity of surgical exposure, operative autonomy, and program reputation are important factors for orthopaedic sports medicine fellowship applicants. Arthrosc Sports Med Rehabil. 2021;3(3):e855-9. https://doi.org/10.1016/j.asmr.2021.02.003

8. B C R, Khadka J, Devkota G, Bhatt PR, Basnet P, Bhatta C. Road traffic injuries, trends, and patterns: a five-year retrospective analysis using secondary police data in Nepal. JNMA J Nepal Med Assoc. 2026;64(293):3-8. https://doi.org/10.31729/jnma.v64i293.9290

9. Banstola A, Kigozi J, Barton P, Mytton J. Economic burden of road traffic injuries in Nepal. Int J Environ Res Public Health. 2020;17(12):4571. https://doi.org/10.3390/ijerph17124571

10. World Health Organization. Global status report on road safety 2023. Geneva: World Health Organization; 2023. ISBN: 978-92-4-008651-7. Available from: https://www.who.int/publications/i/item/9789240086517

11. Kandel M, Shrestha SK, Paudel KP, Bom R, Paudel A, Bhatta TR, et al. Epidemiology of orthopaedic trauma cases at a tertiary level hospital in Nepal: an observational study. JNMA J Nepal Med Assoc. 2025;63(288):561-6. https://doi.org/10.31729/jnma.9152

12. Knulst AJ, Gupta S, Groen RS, Maharjan D, Kapendra AS, Dankelman J, et al. Directions for surgical capacity developments in Nepal: a population-based assessment. Trop Med Int Health. 2019;24(9):1128-37. https://doi.org/10.1111/tmi.13292

13. GBD 2021 Osteoarthritis Collaborators. Global, regional, and national burden of osteoarthritis, 1990-2020 and projections to 2050: a systematic analysis for the Global Burden of Disease Study 2021. Lancet Rheumatol. 2023;5(9):e508-22. https://doi.org/10.1016/S2665-9913(23)00163-7

14. Cieza A, Causey K, Kamenov K, Hanson SW, Chatterji S, Vos T. Global estimates of the need for rehabilitation based on the Global Burden of Disease study 2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet. 2020;396(10267):2006-17. https://doi.org/10.1016/S0140-6736(20)32340-0

15. Rokaya PK, Dulal S, Kathayat TS, Rajbanshi M, Rawal M, Marasini P, et al. Upper limb injuries in children presenting to a tertiary care center in rural Nepal. J Nepal Health Res Counc. 2026;24(1):75-9. https://doi.org/10.33314/jnhrc.v24i01.4985

16. Meara JG, Leather AJ, Hagander L, Alkire BC, Alonso N, Ameh EA, et al. Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development. Lancet. 2015;386(9993):569-624. https://doi.org/10.1016/S0140-6736(15)60160-X

17. Pathak RK. Diaphyseal forearm fractures without fluoroscopy: titanium elastic nailing system (TENS): a paediatric case series from Nepal. Trop Doct. 2026;56(4):749-51. https://doi.org/10.1177/00494755261457477

18. Challa S, Conway D, Wu HH, Bisht R, Sherchan B, Lamichhane A, et al. Can a 2-day course teach orthopaedic surgeons rotational flap procedures? An evaluation of data from the Nepal SMART course over 2 years. J Orthop Trauma. 2018;32 Suppl 7:S38-42. https://doi.org/10.1097/BOT.0000000000001298

19. Shah RK, Thapa VK, Jones DH, Jones R. Improving primary orthopaedic and trauma care in Nepal. Educ Health (Abingdon). 2003;16(3):348-56. https://doi.org/10.1080/1357628031000160763l

20. Silvestre J, Seeger S, Ravinsky RA, Lawrence JP, Kang JD, Harris MB, et al. Geographic disparities in the adequacy of the orthopaedic surgery workforce relative to other musculoskeletal medicine specialties. J Am Acad Orthop Surg. 2026;34(9). https://doi.org/10.5435/JAAOS-D-25-00300

21. Roshan V Patel 1, Marcos R Gonzalez, Numair Attaar, Misha V Patel, Santiago A Lozano-Calderon. Analyzing Orthopaedic Workforce Trends in an Ever-changing Landscape. J Am Acad Orthop Surg. 2025 Jun 6;33(14):780-786. https://doi.org/10.5435/JAAOS-D-24-00797