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Article – Feature

A Spotlight on the Various Subspecialties of Orthopedic Surgery

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Introduction

Currently, 60% of orthopedic surgeons are specialists, 25% have specialty interests, and the remaining 15% are generalists.¹ Given the numbers, most orthopedists focus on a specific anatomical area or patient demographic, from delicate nerve work to the larger surgical field encountered in adult reconstruction. This article embarks on a journey through the diverse and impactful world of orthopedic subspecialties, shedding light on the breadth of practice offered.

According to Joseph A. Abboud, MD, a Rothman Orthopedics upper extremity surgeon, residents typically decide on a sub-specialty in their third or fourth year. For medical students, whether captivated by orthopedics or still exploring future specialties, this article serves as a starting point to understanding the subspecialties and as a potential guide to future specialty choices. This article also aims to illuminate the characteristics within each subspecialty, hopefully spurring more interest in the diverse and fascinating craft.

Oncology

Orthopedic oncology commands a specialized skill set dedicated to benign and malignant musculoskeletal tumors from limb to spine. However, despite their importance in patient care, these surgeons only compose a modest 1.5% of orthopedic surgeons based on a 2018 poll by the AAOS.¹ These highly trained professionals typically operate within university-based practices, where they collaborate with multidisciplinary teams to address both pediatric and adult patients.² These teams include medical oncology, radiology, pathology, and other specialists. According to Dr. Abboud, orthopedic oncologists' interdisciplinary nature often makes them crucial contributors to hospital revenue. Oftentimes for orthopedic oncologists, volume as a pure specialty can be somewhat limited given the nature of the diseases they are treating. Not uncommonly orthopedic oncologists are also fellowship-trained in other complementary subspecialties such as adult reconstruction. They often are involved in that area as well to help maintain the RVU productivity

necessary for an orthopedic surgeon. To become an orthopedic oncology surgeon, one must complete a 1-year oncology fellowship following orthopedic residency.

Total Joint and Adult Reconstructive Surgery

Total joint and adult reconstruction surgery is a specialized field within orthopedic surgery that focuses on the intricacies of primary and revision joint replacement surgeries. These surgeons emphasize restoring function, relieving pain, and improving the overall quality of life for patients. Additionally, they are experts on the biomechanics of prosthetics, perioperative care, and rehabilitation protocols. According to the 2018 AAOS survey, adult reconstruction is the second most common subspecialty among orthopedic surgeons, accounting for 14.4% of the field.¹ Moreover, the demand for hip and knee joint replacements is projected to surge by almost 40% by 2060, underscoring the growing significance and appeal of adult reconstruction in addressing the needs of an aging population.³

Identifying the joints of focus involves considering various factors such as geographic location, competitive landscape, and individual preferences. Dr. Abboud highlights that the viability of breaking into the field may differ for specific joints, influenced by competition among surgeons and governed by supply and demand. With that being mentioned, joint reconstruction is typically a hip and knee specialty. Another notable consideration is that 30.4% of orthopedic surgeons pursuing a second fellowship choose to specialize in adult reconstruction,⁴ the third most common second fellowship. Dr. Abboud postulates that this trend may be due to the increasing demand and aging population making it a very desirable secondary subspecialty. For example, a sports surgeon with adult reconstruction fellowship training may better maintain a continuum of care from a young athlete's ACL reconstruction through to knee replacement in later life. This ultimately extends the training duration by another year, thereby delaying practice as an attending physician.

Spine

The orthopedic subspecialty of spine surgery represents a niche within the field, as evidenced by the 8.3% representation of orthopedic surgeons specializing in this area, according to the AAOS 2018 census.¹ Orthopedic spine surgeons focus on spinal conditions including degenerative disc diseases, herniated discs, spinal fractures, scoliosis, and spinal tumors.² Given the complexity, they also often work closely with a multidisciplinary team, including neurosurgeons, plastic surgery, general surgery, physical therapists, and pain management specialists.

An interesting consideration is the overlap in cases with neurosurgery. According to the AAOS and recent research, case split may be determined by geographic factors as well as referring physician trends.^{2,5} The role also demands continuous education to stay abreast of evolving literature regarding technologies and techniques.

According to Dr. Abboud, the field of spine surgery can be very rewarding, however, the nature of operating near the spinal cord has its fair share of risks and sometimes unavoidable complications. The stakes are particularly notable in terms of perioperative mortality rates, underscoring the gravity of spinal surgeries. Compounding this is the high risk for liability and malpractice concerns. Consequently, spine surgeons must exercise careful patient selection, navigating the delicate balance between the potential benefits and risks associated with these intricate procedures.

An important factor for those considering spine surgery is the length of surgery. Spine cases can be fairly lengthy and nuanced, given the delicate nature of the work that needs to be done according to Dr. Abboud. Another consideration is the degree of specialization. In this subspecialty, surgeons predominantly find themselves on 'spine call'. Orthopedic spine surgeons often stop taking general orthopedic call, limiting their exposure to the rest of orthopedics and adding to the unique nature of the subspecialty. To become an orthopedic spine surgeon, one must complete a 1-2 year spine fellowship following orthopedic residency.

Sports Medicine

Orthopedic sports medicine focuses on injuries related to sports and physical activity. Sports medicine physicians understand the unique demands that athletic endeavors place on the musculoskeletal system. They work with athletes of all levels, from weekend warriors to elite competitors, addressing conditions such as ligament tears, joint instability, fractures, and overuse injuries. According to Dr. Abboud, sports lend itself to being highly customizable with a full selection of joints and operations in the tool belt. These can be further narrowed down as a sports medicine surgeon's career advances down to single joints or even just arthroscopic procedures. This versatility is seemingly greatly appreciated among orthopedic surgeons making it the most common specialization at 18.2% of respondents on the AAOS 2018 census.¹ It is also the second most common double fellowship at 38.7% of those with a second fellowship.⁴ This trend of high specialization is reflected in the unique availability of certification in sports medicine offered by the American Board of Orthopaedic Surgery. Surgeons

looking to obtain this certification are required to sit for a 175 multiple-choice examination and submit a 115 operative case log for consideration. Once certification is obtained, it can be renewed together with orthopedic board certification.⁶

These specialists collaborate with physical therapists, athletic trainers, and other healthcare professionals to develop comprehensive treatment plans. In addition to managing acute injuries, orthopedic sports medicine also emphasizes injury prevention techniques and training regimens, to help individuals optimize their performance while minimizing the risk of injuries. Dr. Abboud states that sports medicine surgeons offer a wide array of non-surgical interventions, which oftentimes in and of itself can be rewarding. Another consideration is the growth of non-operative sports medicine physicians. From 2016 to 2021, the total number of sports medicine doctors grew by 42.5%, from 2,252 to 3,208 practicing physicians.⁷ This trend makes it more important for orthopedic sports surgeons to have good collaborative relationships with their non-operative sports physician colleagues. At its highest levels, sports medicine can present unique challenges in dealing with professional organizations, teams, media, and high-status athletes as well. There can be competing interests, and media training is sometimes required. To enter the field of orthopedic sports medicine, one may complete a 1-year fellowship.

Foot and Ankle

Foot and Ankle is a commonly overlooked subspecialty of orthopedics, making up just 5.2% of orthopedic surgeons.¹ Orthopedic surgeons in this field, much like sports medicine, have a diverse case mix. Dr. Abboud finds that Foot and ankle surgery encompasses a wide spectrum of procedures, ranging from intricate fracture repair to joint replacement. In the realm of aesthetics, these specialists may also perform procedures for cosmetic concerns, such as correcting bunions or hammer toes. Additionally, foot and ankle surgeons often find themselves managing patients with systemic diseases. They can expect to see a sicker patient population than the average orthopedist given the pervasive nature of vascular disease, end stages of diabetic neuropathy, and Charcot joints. Moreover, foot and ankle surgeons may face competition from podiatrists, who also specialize in lower extremity care. The American Academy of Orthopedic Surgeons recommends educating referring physicians and the general public on the role of orthopedic surgery and the differences between orthopedic foot and ankle specialists and podiatry.² Fellowship in Foot and Ankle is a 1-year fellowship program.

Hand

Hand surgery is the third most common specialization within orthopedics, accounting for 11.6% of respondents of the 2018 AAOS census.¹ Hand surgeons specialize in a wide range of hand-related issues including fractures, ligament injuries, nerve disorders, and degenerative conditions. The share of these pathologies can be determined by training, given the various pathways to becoming a hand surgeon. One training route is to choose the traditional orthopedic pathway. The other route is the plastic surgery pathway where typically a surgeon will complete a plastic surgery residency followed by a sub-specialization in hand surgery. A study between these groups found orthopedic hand fellows did more trauma work than plastics-trained hand fellows, while the opposite was true for nerve work.⁸ Another factor determining case mix is practice setting. Academic centers typically undertake complex procedures such as replantation, necessitating substantial resources. Private practice more commonly deals with 'bread and butter' cases such as carpal tunnel, trigger finger, and simple fractures. Orthopedic hand surgeons are more commonly in private practice as compared to plastic-trained hand surgeons.⁹ Additionally, arthroplasty is relatively rare in hand surgery. According to Dr. Abboud, their call duty is notoriously challenging, as they often encounter traumatic injuries and infections requiring swift and emergent interventions. Despite the demanding nature of their work, these surgeons face lower reimbursement rates, underscoring the necessity at times for high patient volumes. It also provides the rare opportunity for delicate nerve work, free and rotational flaps, and microsurgery – a far cry from typical orthopedic boney work. Completion of a 1-year fellowship in hand surgery is required for certification in hand surgery offered by the American Board of Orthopaedic Surgery. Surgeons looking to obtain this certification are required to sit for a 175 multiple-choice examination and submit an operative case log for consideration. Once certification is obtained, it can be renewed together with orthopedic board certification.¹⁰

Pediatrics

Pediatric orthopedics represents a relatively uncommon subset within the orthopedic field, comprising 5.1% of respondents on the 2018 AAOS census.¹ Notably, 28.6% of practitioners in this field are under the age of 40, indicating a trend towards a younger demographic.¹ According to Dr. Abboud, pediatric orthopedic surgeons often operate in large medical centers usually under the employed model. In this model, physicians are hired directly by a larger health organization typically with a more stable salary and administrative duties, but somewhat less

autonomy and typically a greater ceiling on their economic productivity. One distinctive challenge in pediatric orthopedics is the emotional aspect of dealing with stressed parents, given the vulnerability and concern often associated with children's health. This requires surgeons to not only possess technical expertise but also effective communication and empathy skills to navigate the complexities of pediatric care and support both young patients and their families. Interestingly, orthopedic residents get a strong exposure to pediatrics given the ABOS mandates at least 6 months of service time during their 5-year residency, one of only two subspecialty areas to have minimums.¹¹

Trauma

Orthopedic trauma surgery accounted for 5.8% of the AAOS 2018 census. A substantial 31.5% of practitioners in this domain are under the age of 40, reflecting a relatively younger demographic. According to Dr. Abboud, Trauma surgeons in this field often aspire to work at level 1 trauma centers where they can encounter diverse and complex cases. This typically reserves practice to large cities and academic centers. Additionally, there is a variable payer mix, or large diversity in their patient's insurance model. This varies from government-funded (Medicare and Medicaid), to private pay and even uninsured patients in this population. This often drives orthopedic trauma surgeons to a more stable employed model for the stability of their income.

Despite the excitement inherent in trauma surgery, practitioners face a notable risk of burnout, given the demanding and high-pressure nature of their work. The wide range of mechanisms in orthopedic trauma from motor vehicle collisions to gunshot injuries necessitates a versatile skill set and creative operative decision making. They also tend to work collaboratively with multiple specialties such as general surgeons, thoracic surgeons, neurosurgeons, and plastic surgeons given the sometimes blunt and penetrating trauma they deal with. Orthopedic residents have a strong background in trauma given that the ABOS requires 46 weeks of training on trauma service.¹¹ For those looking for further specialization, the fellowship is 1-year long. Remarkably, 40.1% of those pursuing a second fellowship opt for trauma, making it the most common additional fellowship.⁴

Shoulder and Elbow

Shoulder and elbow orthopedists are well-versed in addressing fractures, dislocations, ligament injuries, arthritis, and tendon disorders, covering both soft and hard tissue. According to the AAOS 2018 census, 28% are under 40 making it the third youngest

specialty in orthopedics.¹ They also compose 4.3% of all orthopedists.¹ Common procedures within shoulder and elbow orthopedics include arthroscopic surgeries, joint replacement surgeries, and fixation of fractures. The goal of shoulder and elbow orthopedics is to optimize joint health, enhance mobility, and improve the overall quality of life for individuals facing these challenges. There is a high demand for shoulder and elbow surgeons given the necessity of these joints to perform activities of daily living. As patients age, they become more reliant on their upper extremities to bear weight, for example pushing on armrests to stand from a seated position or needing a cane or walker to ambulate successfully. Another consideration is the requirement to take general orthopedics call while still early in your career. Shoulder and elbow surgeons tend to take general call for a few years and depending on practice setup, can then develop a purely elective practice not so focused on trauma. Shoulder and elbow is a 1-year fellowship after residency.

Conclusion

The world of orthopedic subspecialties offers a broad spectrum of opportunities. As many orthopedists focus on specific anatomical areas or patient demographics, subspecialty selection has become more important. This article has provided a glimpse into the options available to residents and medical students as they start to navigate the process of choosing a career and ultimately a subspecialty in that career. It is important to remember the information discussed here is dependent on a variety of factors including location, practice type, and training. Whether you're a medical student exploring specialties or one with a focus in orthopedics, the insights shared here aim to empower and guide your career.

Resources:

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