

Generation Z in orthopaedic surgery

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A new generation evolves every 15 to 20 years. Each generation shows complexities and interactions between generations that are interesting and true (Table). Generation Z, also known as Gen Z, Zoomers, post-Millennials, Zers, iGeneration, Internet generation, Homeland generation, Founders, Pivotal, Generation nice, Screenagers, Share generation, Centennials, and Plurals, is the name given to the generation of young people born in the late 1990s up to the early 2000s. They are the successors to generation Y (Millennials) and precede generation Alpha (the children of Millennials).^{1,4} Generation Z is the first generation to be born into the world of Internet, smart devices and apps. They spend more time on electronic devices, and on the Internet than any previous generation. Their smartphone is an extension of their hand, and their smartwatch does more than just tell time. Currently, generation Z are the people in orthopaedic residency and early practice.^{1,4}

The first members of generation Z entered residency programs in 2020, and currently many are working in hospitals as residents or junior physicians.^{1,4,8} Zoomers believe the practice of medicine should not be exhausting, but fulfilling. They dislike spending long periods of time listening to lectures, and they mirror their experiences in social media. Meetings and hospital duties should be minimal and absolutely scheduled in order to ensure a good quality of life, and accompanied by a defined period



Figure. Generation Z surgeon in practice.

of daily work that should not be exceeded.^{1,4} Working less and paid more will be the attitude in the practice of medicine.^{1,4,8}



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Table. Summary of social generations and their characteristics.

Characteristics	Lost generation	Greatest generation	Traditionalist generation	Baby boomers	Generation X	Generation Y (Millennials)	Generation Z	Generation A
Birth dates	1880-1900	1900-1930	1930-1945	1945-1965	1965-1980	1980-1995	1995-2015	2015-2020s
Description	The young people who came of age around the time of World War I (the Generation of 1914; la Génération du feu; the [gun]fire generation)	The young people who came of age around the time of World War II (the G.I. generation; the WWII generation)	The silent generation (a small generation because of effect of the Great Depression and World War II)	The people born after the World War II during the mid-20th century baby boom (noticeable increase in the birth rate, The Boomers), during and after the Vietnam War, the Civil Rights eras and the Watergate scandal.	The children and young people returning from school to an empty home and needing to use a key to let themselves in the house (The Latchkey Generation) because of free-range parenting (decrease fertility, increased divorce rates, increased maternal participation in the workforce, and decreased childcare options outside the home)	The oldest people of this generation became adults with the turn of the millennium (the Millennials), the first people to grow up with the internet (The Digital or the Global generation), the people who tend to return a call with a text message (The Texters), the people who experienced the slower economic growth and more recessions since entering the workforce than any other generation (the Unluckiest Generation). The majority are the children of Baby Boomers	The first people to have grown up with access to the internet and portable digital technology from a young age The majority are the children of younger Baby Boomers or Generation X	The first people to be born entirely in the 21st century and the third millennium (the Alpha generation) The majority are the children of Millennials
Historical notes	World War I, Industrial Revolution	World War II, Great Depression	World War II, Great Depression	Space exploration, nuclear threat	Vietnam War, end of Cold War, September 11 terrorist attacks	The turn of the millennium	Terrorism, social networking, smartphones, shared family responsibilities, gender equality, climate change	COVID-19 pandemic, climate change (will be significantly more affected by any other generation)
Technologies	Radio (soap operas, music, sport, educational broadcasts, news, political propaganda)	Rapid technological innovation (radio, telephone, automobile)	Industry Energy (radio, newspaper, television)	Plastics, television, magnetic tape, transistors, integrated circuits, and lasers	Mass media, increasing rise of the internet, computers and social media	Internet, computers, social media, mobile devices, and technology in general, developments in artificial intelligence and robotics	Information and communications technologies, social media networking	Information and communications technologies, social media networking, streaming services, parental internet use, decreasing interest in traditional television
Education	Laws restricting child labour. Compulsory education	The average educational attainment was less than 9 years (compared to 12 years for their children)	Compulsory education from the age of 5-14 years old Reading comics, playing board games, going to the cinema, and joining children's organizations such as the scouts	Modern mathematics (Bourbaki school), physics, college education, traditional classroom setting, focus on lectures and textbooks, often self-directed learners and valued face-to-face interactions with their teachers	Comprehensive school training, continued growth in college enrolments	More better educated people from developing nations, more people with high-school diplomas and Bachelor's degree, many jobs were suitable for remote work due to modern technology (backlash against immigration and globalization)	High enrolment in primary schools and colleges in both developed and developing countries, favour innovative educational and training solutions, pragmatic, tech-savvy, and flexible personalized education that is aligned with their career aspirations	Increasing use of technology in classrooms and other aspects of life, born into a world overflowing with knowledge provide a unique educational model and demands special opportunities and innovative approaches from teachers

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Health and welfare	Sewer systems to remove human waste, legal standards for the quality of drinking water, gas lights and candles	Electricity, flourishing of literature, arts, music, and cinema	Economic conditions and living standards improved significantly, unemployment rested (2%) and consumer goods became common, abortion and homosexuality were illegal, reformed marriage laws allowed for increased divorces	Optimism, economic prosperity, a growing middle class, and tremendous improvements in the standards of living for the average citizen in the developed world (the average person could live like the upper class in the previous generation)	The first to come of age with MTV and music videos, largely responsible for the indie film movement Possibly higher risk of heart attacks because of high-blood pressure, diabetes, and chronic kidney disease	Social networking (Facebook and Twitter) The highest rates of overweight and obesity, strokes, heart attacks, drug addiction and overdoses, mental health issues, dental and oral health issues	Reliant to the internet to research their options and to place orders, relatively high income and high spending habits Health and mental health issues, screen time effects, sleep deprivation, cognitive abilities, myopia, food allergies, obesity, arthritis, stroke, anxiety, depression, early puberty, cyberbullying	Decreasing fertility rates because of rising standards of living, higher access to contraceptives, and more educational and economic opportunities Health and mental health issues, screen time effects, allergies, obesity and malnutrition
Attributes	Rejection of: materialism, youthful idealism, and the American Dream	Self-sacrifice, frugal consumers and prudent savers.	Self-sacrifice, traditional, conservative in experience and attitudes (the people who believes the old ways are best)	Altruism and intellectual stimulation, less self-centered, optimism, rule follow, lived to work	Unimpressed, high self centered, sceptical, reject rules	Hopeful, high self centered, re-write rules	More educated, well-behaved, sceptical, stressed and depressed compared to previous generations, heavily influenced by trends promoted by influencers on social media, need to be trendy	Digital natives and spending hours in front of screens, engagement with diverse artificial intelligence technologies, environmentally conscious
Authority	Aimless, disoriented, wandering, directionless spirit	Respectful, patriotic	Respectful, often serving as role models for other generations	Respectful, love/hate, altruism	Individualists, entrepreneurial spirit	Informal, seek autonomy	Seek autonomy, give immediate feedback (texters)	Diverse
Leadership	Confusion and aimlessness in the early post-war years.	Hierarchy, committed and loyal	Hierarchy, professionalism, and dedication	Consensus, hierarchy, less self-centered	Competence-based	Team-based	Dislike micromanagement, more concerned than older generations with academic performance, job prospects, and delaying gratification	To be seen
Reward style	Focused on material wealth, unable to believe in abstract ideals	Job well done, modestly living, strong work ethics	Job well done, strong work ethics	Money, title, work to save for retirement	Freedom, values security and independence, achieving a work-life balance, work to live	Transparency in working, meaningful work, economic return values, work and enjoy	Transparency in working, meaningful and challenging work, values purpose, ethics and life at work balance, live and enjoy	To be seen

Generation Z surgeons spend less time reading books. Nonetheless, they are very educated, mostly because they have continuous digital access to an enormous amount of knowledge and information from the Internet. However, although they are skillful at finding information, often they do not analyze that information for validity and accuracy; if the information appears on the web it is assumed *de facto* accurate and true.¹⁻⁴

Generation Z are less politically correct in their daily behavior, and they are very dedicated to their overall personal wellness.³ They are less self-confident and less likely to ask questions due to insecurity and anxiety. They have an increased acceptance of sexual and gender fluidity and reject gender stereotypes.¹ Their addiction to digital life creates deficits in attention spans, vocabulary, and performance at university; 40% of generation Z people self-identify as digital device addicts, and another 40% report feeling bad about themselves as a result of social media.¹ Only 60% of generation Z are optimistic about their future compared to 89% of Millennials, and 28% are motivated by money compared to 42% of Millennials.⁶ At least 75% of generation Z are not happy with email, they find it takes too much time and is too formal, and approximately 70% of generation Z and Millennials will prefer to reply with a text message than answer or return a telephone call (the generation of

texters). The potential reasons for this are the anxiety associated with real-time conversations, potential awkwardness, not having the answers and the pressure to respond immediately. Most conversations take place on social media with images, memes and emoticons alongside texts.⁷ A further complication to their educational development is their inability to concentrate. The attention span for Millennials was 10 minutes, but for generation Z it is 6 minutes and may be as short as 8 seconds when using a digital device.^{1,9}

It is concerning that generation Z curriculum vitae are short, and they exhibit more difficulty in writing a medical paper than previous generational cohorts.^{4,10-12} Most seem to be seeking the easy way; they misuse the Internet and Artificial Intelligence (AI) tools to write, translate, and correct medical papers. This is acceptable if performed correctly; however, AI should not replace a well-crafted human manuscript, and if used it should be acknowledged and disclosed.^{10,11}

At AOTH, we have adapted our editorial policy to meet the preferences of young authors; we encourage them to write and submit their papers to be considered for publication at the journal, and we have reserved a special section in the journal for papers submitted by young scientists. We hope that AI will become more helpful than harmful in continuous medical education and academic writing.

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