

## Contribution of Surgical Procedures Including Insertions of Implants, Stents, and Pacemakers to Longevity

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### Introduction

Several factors enhance longevity [1]. Surgical procedures have been carried out increasingly each year for the past two hundred years since Lister experimented with developing sterile techniques to perform them [2]. Today surgeries are performed in outpatient clinics and in hospitals requiring stays ranging from few hours to overnight stay and at times several days stay [3,4]. There are several different types of surgeries performed in this century [5] ranging from tonsillectomy, appendectomies to cardiac bypass surgeries [6-9], transplantation [10-12], removal of benign and malignant tumors, gall stone and kidney stone removals, hip, and knee replacements [13-16], bariatric and metabolic surgery [17], cataract removal and lens insertion, insertion of implants, stents [9], pacemakers etc. All these surgeries done either due to emergencies or elective (prescheduled) potentially extend life significantly. Family history and impact of genomics has added to a pioneering way of performing surgeries to anticipate possible future cancers in an otherwise perfectly healthy individual, which I characterize as pre-emptive or anticipatory surgery. An example of such a surgery to ensure longevity is that of Actress Angelina Jolie who had her breasts removed in a classic case of preventive double mastectomy, when she had no sign of breast cancer but had family history and had a gene *BRCA1* that predisposed her to breast cancer. As genome analysis of an individual by organizations like 23 and Me become more common; certain cancers and harmful conditions can be anticipated and action could be taken to prevent them. One in every 6 or 7 women are predisposed to breast cancer and an estimated 87% risk of breast cancer and a 50% risk of ovarian cancer in those with a defective allele of the *BRCA1* gene and a family history. Two cases of longevity studied by me in detail based on availability of medical history in public domain and privately of Nelson Mandela, the late president of South Africa who passed away at the age of 95 and JVK, respectively who is living in his 98th year have suggested that longevity is multifactorial. Both individuals were born with no known genetic abnormality. JVK was born with 11 fingers (polydactyly), the abnormal finger was removed early on during childhood. Both underwent cataract surgeries in both eyes at later stages of their lives in their 80s and 90s. In addition, being able to have a decent vision is of importance in avoiding falls and bumping into objects, which commonly can cut short lives. So, the impact is more indirect but surgery is essential. Mandela also had gall stone surgery and removal of a benign tumor from an enlarged prostate. JVK had a hydrocele operation 38 years ago, an auto mechanic in Louisville, KY who I have known for over a decade received a kidney transplant from his brother some 37 years ago, He may or may not live into his 90s but having lived for that many years, post transplantation with continuing immunosuppressive therapy for that long, clearly demonstrates the lifesaving value of having undergone the surgery. Others with a direct

impact for longevity is bypass surgery and introduction of stents, the former president of Taiwan Lee Teng-hui, who is now in his early 90s has had a coronary artery bypass surgery and stents placed in his coronary arteries and that have kept his heart functional and kept him alive. In addition, he underwent surgery to remove stage II colon adenocarcinoma, the most common form of colon cancer. Zsa Zsa Gabor, a former actress and known for having married 8 times who died recently at 99 had a hip replacement surgery six years ago, after falling out of bed and in the following year had her right leg amputated to prevent the spread of gangrene. It is difficult to predict or quantify how much longer a person will survive after any particular surgery or what exactly contributes to longevity. Based on my hypothesis that longevity is multifactorial, if a person has started off with a normal set of genes, then the person has a possibility of living long into the 90s and 100s if that person also has a lifestyle that is vigorous in youth and appropriately active as age progresses, balanced nutrition with caloric restriction at later stages and good eating and drinking in moderation or not at all, can also contribute to longevity. Infection control and wound care is critical all throughout life as suggested by Kotwal and Chien [18]. Based on the 4 cases of persons either lived in their 90s or are still living in their 90s and another who has survived a transplant to replace a failed kidney due to the consumption of a gallon of milk every day in his youth for a long time discussed here, one can say with some certainty that having optimal medical care and appropriate timely intervention with surgeries and other procedures will have a significant impact on extending life and bench marking a health care system [19]. There should not be a discrimination of a person and being denied having any surgery based on age alone [19].

### Surgery and Surgeons

Surgeries are to be performed by skilled experienced specialist surgeons in a well-equipped and immaculately maintained facilities and with a competent team of nurses, anesthesiologist, clinical chemist's pathologists etc. Surgeons are scarce and with an estimate of 20% of surgery residents dropping out there will be a growing need for surgeons. Laparoscopic advances in robotic surgery has certainly decreased the time required for surgery as well as the hospital stay recovery period, 37 years ago and will continue to contribute significantly to longevity. A surgeon will also have to determine the fitness of the patient to withstand the surgery and this is more critical if a patient has other conditions that could prove hazardous during a surgery.

### Surgery and Health Insurance

Cost of surgery can vary from a few thousand to hundreds of thousands and so unless a person is wealthy enough to afford any kind

of surgery, health insurance companies will enforce strict guidelines to determine the justifiable need for an insured to undergo a particular surgery. In a recent case of a benign right adrenal myelolipoma, the insurance company would only pay if the lipoma measured more than 5 cms. Even then the decision was difficult because the endocrinologist was against it stating a previous case of a person living with large myelolipomas on both adrenal glands. The chances that the myelolipoma could rupture and cause serious complications was an overriding reason for the surgeon to convince the patient that an adrenalectomy would contribute to longevity in this case. A surgeon will have to monitor the patient post-surgery to ensure the healing of the incisions made during a surgery. Most hospitals have a decent record of new resistant bacterial infection but that should influence a decision to undergo surgery in a particular hospital. There have been cases where senior citizens on immunosuppressive therapy have died due to an infection caused by the hospital air and surfaces being contaminated with fungus or bacteria. Longevity is about avoiding death and all possibilities have to be weighed before a decision is made that can adversely affect a person's health.

## Surgery and Patient

A patient is central to decision making regards consenting to undergo surgery. There will be times when a surgeon presents a scenario that surgery will save life and contribute to longevity but the patient has to be mentally prepared and ready to have a support. In a recent case where a 60-year-old patient was prepared to undergo removal of an incidentaloma (a tumor that was found on his adrenal gland while searching for an abdominal abnormality) but could not be cleared for surgery by a cardiologist who conducted a stress test, which the patient failed. Upon doing cardiac catheterization of the coronary artery, the patient was found to have significant blockages and the cardiologist referred the patient to a cardiac surgeon for scheduling a coronary artery bypass. The patient was not mentally prepared to go under the knife and have his sternum cut up and blood supply to his heart stopped temporarily. He then got a second opinion from another well-known cardiologist who advised against bypass upon examination and taking a look at the results of his CT scans. He then got a referral to a third cardiologist who resolved the issue and inserted stents to clear all the blockages. Essentially the same outcome was achieved with a dramatically less invasive surgical procedure. The patient over 60 has to be very well informed and realize the consequences and weigh all options to undergo a procedure that will achieve longevity without undergoing a procedure that could go wrong and hasten death. Dr. Steven Lewis now in his late 60s is a classic example of how a patient who is well informed and researches his terminal condition thoroughly and demands the state of the art treatment from the best medical care clinic in Boston area can survive and extend life. Any other person in his place and with his condition would be dead a decade ago. But two-time survivor of pancreatic adenocarcinoma, Dr. Lewis has miraculously survived and avoided certain death. In 2014, he authored a book about his cancer experience titled, "The Ripple Effect: How a Positive Attitude and a Caring Community Helped Save My Life." Various accounts of Steven's pancreatic cancer survival story have been published in newspapers, magazines and on the Internet in the form of essays, radio interviews and podcasts. Very recently, his story of hope was published on the website of the American Cancer Society and was the subject of his inspirational address at Brandeis University. Steven Lewis received a PhD degree in exercise physiology from Stanford University in 1977 and is a professor at the Charles E. Schmidt College of Medicine, Florida Atlantic University, Boca Raton,

Florida. Inspiring cases such as this should increase awareness of people who wish to live a full life that longevity is not to be taken for granted and that everything that needs to be done should be done by a person who aspires to live long while at the same time have a good quality of life with the support of family, medical community, government, and the insurance provider.

## Conclusion

Timely and appropriate surgeries can be a major key to longevity and healthy lifestyle. Life lived after a lifesaving surgery is easily quantifiable as the years lived following the surgery, which would have not otherwise been possible but life lived after some of the surgeries which are not lifesaving but avoidance of death or preempting future complications in life may not be clearly indicative as being contributing to longevity and more research may be needed to assess the surgical contribution to longevity. A decision to undergo surgery has to be made through close consultation and discussion between a surgeon and his patient and there has to be clear understanding of the expectations, rationale for the surgery, possible complications. A second or third opinion will never hurt in working towards a desired outcome contributing to longevity.

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