

Forty is the new Thirty (Advances in the medical & scientific fields –Individual Paper Title)

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Individual Outline

1. Advances in Medical Technology
 - A. Heart Valve Technology
 - B. Surgical Advances for Arthritis – Arthroscopy
2. Advances in Drug Therapy
 - A. High Blood Pressure
 - B. High Cholesterol
3. Genetic Research – Future Possibilities

Abstract (Individual Thesis)

Not only can we assess numerous areas of fitness through the Over 40 Physical, but we can often fix Soldiers who get broken. Today, Soldiers over 40 can achieve greater levels of physical fitness, and will continue to do so in the future, due to unprecedented advances in medical technology, specifically in the area of surgical and chemical (drug) treatment, and genetic research.

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Let us begin by looking at what may arguably be to date the most profound medical breakthrough ever, the ability to repair the human heart. It is currently possible to get a new heart, whether through actual heart transplant, or through an artificial heart itself. However, it is neither the easiest solution nor the most cost effective. As senior NCOs, we know the bottom line for most equipment is cost balanced with ready availability. Therefore, the practical solution is to fix the heart we have.

Advances specifically in the arena of prosthetic heart valves in the past 40 years are amazing. Since the first attempts at valvuloplasty (fixing heart valves) in the 1920's, we have moved closer and closer to simulating living human tissue and organs. By the beginning of the 1960's, criteria were set forth that artificial heart components be tissue and blood friendly, did not cause blood clots, would last for years, and would be able to be placed in the correct spot physiologically. In the near future, doctors will continue to look at new materials with which to construct artificial heart components, adding advanced computer components to regulate devices, and with the wonders of genetic research, we may one day be able to combine mechanical and biological components, bringing a new era of "heart healthy" technology. (Chaikof, 2007)

Heart valve technology is only a small part of the breakthroughs in the area of treating cardiovascular disease. Time would fail us to talk about the surgical wonders when repairing aortic aneurisms, carotid artery disease, coronary heart disease, or installing pacemakers. Four

decades ago, Soldiers with these issues would have certainly retired, but thanks to such technology, Soldiers over forty can continue to maintain fitness levels that allow them to perform on the front lines of the battlefield.

Another key area of surgical ingenuity that has kept the over forty Soldier in the fight is in advances in the area of arthritis. According to the Arthritis Foundation, as of 2006, almost 46 million people (1 in 5) in the U.S. have arthritis (Arthritis Foundation, 2007). While no substantial, published data exists to identify exactly how many Soldiers today suffer from arthritis, which includes over 100 separate diseases pertaining to areas in or around joints, military statistics generally tend to follow trends of the U.S. population (Arthritis Foundation, 2007). While Army numbers of arthritis sufferers might be slightly lower due to a younger population, all of us have undoubtedly sent numerous Soldiers on sick call for various pains of the knees and joints, or perhaps even been an arthritis sufferer ourselves. If so, fear not, there is good news.

Today, thanks to technology, a Soldier with arthritis that requires surgery does not have to sit on the bench. Arthroscopy is a technique used extensively to treat various types of knee, shoulder, and wrist damage due to various types of arthritis. Arthroscopy uses a camera (arthroscope) to examine or repair damaged tissue, burrs on bones, cartilage, or ligaments. It requires only a few small incisions and is less invasive (UPHS, 2006). The modern Soldier is often compared to a professional athlete, and according to Wikipedia, arthroscopy is preferred among pro athletes due to the reduced recovery times. Arthroscopy also leads to an increased surgery success rate, due to the fact it causes less damage to surrounding tissue (Wikipedia, 2007).

As the War on Terror continues, arthritis and joint related injuries will continue to trouble Soldiers. Modern arthroscopy, as well as surgical treatments for the heart and cardiovascular disease, will continue to allow Soldiers over forty to maintain their fitness and fighting edge.

Let us now turn our attention towards another equally promising area of medical science: Pharmacology. Today there is a pill for everything and anything. If you suffer from allergies, diabetes, headaches, or bronchitis, we can treat it with some type of medicine. Not only is arthritis and other aches and illnesses viewed as candidates for chemical remedy, but so are life-threatening diseases such as cancer and HIV. However, pharmacology does not stop there. Not only can we treat attempt to treat physical problems with a pill, but emotional problems such as depression and PTSD as well. For our purposes, let us consider two physical issues that deal with fitness over forty: high cholesterol and high blood pressure.

In the age of Big Macs, KFC, and MREs, high cholesterol is an issue with Soldiers. The fast-paced lifestyle, need for convenience, and desire for luxury has widened our waistline and clogged our arteries. Thankfully, those of us who wake up and realize that all this self-indulgence is not what's best for us, can use modern medicines to help us get back on track. According to the American Heart association, the best drugs to use, when needed in combination with exercise and healthy diet, are the HMG CoA reductase inhibitors. These drugs, referred to as "statins", derive their names from their commercial names such as atorvastatin, pravastatin, etc. These drugs have relatively low side effects, are easy to take, and are highly accepted by most patients (American Heart Association, 2006).

Another health area where many Soldiers over forty need some medicinal assistance is the area of high blood pressure. The National Heart, Lung, and Blood Institute lists nine different types of medicines, which used independently or in combination can produce results based on

your individual needs. A few examples are diuretics; beta-blockers, which slow your heartbeat and cause less blood to be pumped; and Angiotensin converting enzyme (ACE) and Angiotensin II receptor blockers (ARBs), which affect the Angiotensin II in your body, and essentially allow your blood vessels to widen (National Heart Blood and Lung Institute, 2007).

While we may never be able to manage all the factors that lead to different ailments such as high cholesterol or high blood pressure, modern medicine, when used correctly and along with proper diet and exercise, can enhance physical fitness for soldiers over forty. In addition to medical surgeries and medicine, many doctors and scientists view one field as holding superior potential for the future: the area of genetic research.

The possibilities for genetic advancement can be seen in the fictional comic book character Wolverine, a mutant from the popular series Xmen. In the series, each mutant possesses an “X” gene, which gives each one a unique superpower. Wolverine’s special power is that of healing and instant regeneration at the cellular level. While issues such as cloning and stem cell research create moral and ethical dilemmas for many, not to mention the Nazi experiments of WWII, the research in this field may result in the ability to identify and treat numerous diseases or predisposition to such.

While such research is in its infant stage, progress seems to be moving at a rapid rate. Could the future see the introduction of gene therapy that could produce regeneration at the molecular level? Only time will tell. While it seems unlikely the U.S. would ever take such extreme measures as Nazi Germany did in its genetic experiments, it does seem likely that new advances in this area would at least lend itself to better fitness for Soldiers over forty.

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