

A Sustainable Advancement in Surgical Instrumentation: Galaxy II Self-Retaining Surgical Retractor

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Introduction

In the ever-evolving world of healthcare, advancements are constantly being made to improve patient outcomes and minimize environmental impacts. June Medical's Galaxy II self-retaining surgical retractor is a prime example of such innovation. This article explores how the Galaxy II stands out from its competitors, emphasizing its superior environmental profile due to its reduced plastic usage. Additionally, we delve into the responsible management of surgical waste, specifically how incineration not only disposes of waste but also benefits society by providing a renewable source of heat for homes. We will also discuss the essential process of cleaning gases emitted from incineration before they are released into the atmosphere, and the work to date on a Green Galaxy II.

The Galaxy II and its Environmental Advantages

The Galaxy II self-retaining surgical retractor, developed by June Medical, has garnered attention for its impressive functionality, reliability, and user-friendly design. However, what sets this device apart

is its commitment to sustainability through reduced plastic usage. Compared to its competitors, the Galaxy II incorporates less plastic material (only 62g for the Galaxy II Slider), thereby minimizing the environmental footprint associated with its production, use, and disposal.

Plastic Waste Management in Surgical Settings

In surgical settings, the proper management of waste is crucial to maintaining a clean and safe environment. Surgical waste, including single-use instruments like retractors, typically ends up in medical waste streams. This waste is carefully segregated, collected, and then sent to specialized facilities for treatment, such as incineration.

In the United States, the disposal of surgical waste often involves sending it to landfills. Landfilling is a common method of waste disposal, where the waste is buried in designated areas. However, this practice can have environmental implications as surgical waste, including plastic-based instruments and other potentially hazardous materials, may take a significant amount of time to decompose. On the other hand, in the United Kingdom, surgical waste is typically sent for incineration. Incineration provides a more controlled and regulated method of waste management, ensuring the safe disposal of medical waste while also harnessing the energy produced during the process. This divergence in waste management practices, reflects the differing approaches taken by these countries in addressing the environmental impact.

The single use vs reusable debate continue

Many studies have investigated the environmental impact of single-use versus reusable surgical instruments.

Study: “Environmental impact of reusable versus disposable instruments in tonsillectomy: A systematic review”

Researchers conducted a systematic review to compare the environmental impact of reusable and disposable instruments in tonsillectomy procedures. The study evaluated various environmental indicators, including energy consumption, water usage, greenhouse gas emissions, and waste generation. The results favoured the use of disposable instruments, suggesting that they had a lower environmental impact compared to reusable ones.

Study: “Life cycle assessment of reusable and disposable surgical instruments in cataract surgery”

This study focused on cataract surgery and employed a life cycle assessment (LCA) methodology to evaluate the environmental impact of reusable and disposable surgical instruments. The LCA considered various factors, such as raw material production, manufacturing, transportation, use, and disposal. The findings indicated that disposable instruments had a lower environmental impact in terms of energy consumption and greenhouse gas emissions compared to reusable instruments.

Study: “Economic and environmental impact of reusable versus single-use electrosurgical instruments in laparoscopic cholecystectomy”

The study examined the economic and environmental aspects of reusable and single-use electrosurgical instruments in laparoscopic cholecystectomy procedures. It analysed the life cycle costs and environmental impacts associated with both instrument types. The results showed that single-use instruments had lower environmental impacts, primarily due to reduced water consumption and energy requirements during reprocessing of reusable instruments.

Study: “Environmental sustainability comparison of single-use versus reusable laparoscopic instrument sterilization”

This study aimed to compare the environmental sustainability of single-use and reusable laparoscopic instrument sterilization processes. It assessed various environmental metrics, including energy consumption, water usage, waste generation, and greenhouse gas emissions. The findings indicated that single-use instruments had a more favourable environmental profile due to the resource-intensive nature of sterilizing reusable instruments.

Study: "Assessment of environmental impacts of reusable and disposable laryngoscope blades"

This study evaluated the environmental impacts of reusable and disposable laryngoscope blades through a life cycle assessment approach. It considered multiple environmental indicators, such as energy consumption, water usage, waste generation, and emissions. The results favoured the use of disposable blades, highlighting their lower environmental impact compared to the reprocessing and cleaning required for reusable blades.

The Role of Incineration in Waste Disposal

Incineration is a well-established method for managing medical waste, including plastic-based surgical instruments. This process involves subjecting the waste to high temperatures, effectively reducing its volume, and eliminating potentially harmful pathogens. One notable environmental benefit of incineration is its ability to provide a renewable source of energy, as the heat generated during the process is often harnessed for district heating systems.

Energy Recovery and Heating Homes

The heat generated from incineration processes is commonly repurposed to provide warmth for nearby residential areas. This form of energy recovery contributes to reducing the reliance on fossil fuels and helps to offset greenhouse gas emissions. By harnessing the thermal energy produced by incineration, homes in the vicinity can be efficiently heated, offering a sustainable and eco-friendly solution.

Cleaning Gases Emitted from Incineration:

While incineration offers significant benefits in terms of waste reduction and energy recovery, it is essential to address potential emissions resulting from the process. Gases generated during incineration can contain pollutants such as particulate matter, heavy metals, and dioxins. However, strict environmental regulations and advanced technology ensure that these gases undergo thorough cleaning before being released into the atmosphere.

To mitigate the environmental impact, modern incineration facilities are equipped with sophisticated air pollution control systems. These systems employ various filtration methods, including electrostatic precipitators, scrubbers, and bag filters, to capture and remove harmful substances from the exhaust gases. By efficiently trapping and neutralizing these pollutants, the incineration process becomes more environmentally friendly, aligning with strict emission standards.

The Green Galaxy Retractor work to date

- Hospitals say no to recycling.
- Changing materials is a no
- Sterile....potatoskin?!
- Simplified packaging
- Less airmiles

In 2020, together with representatives from Buckinghamshire New University, Oxford University Health Trust, Grondon and a range of experts in medical grade plastic, the product development teams at June Medical worked on a project to make a Green Galaxy II.

Option 1: Recycling

Hospitals have strict health and safety protocols in place to ensure the well-being of patients, staff, and the general public. These protocols encompass the safe handling and disposal of various types of surgical waste, including single-use instruments. While recycling is an essential practice for reducing environmental impact, it is not feasible for hospitals to single out one specific piece of surgical waste for return to the manufacturer for recycling. This is primarily due to the potential risks associated with handling and storing individual items that have come into contact with biological fluids or pathogens.

Hospitals must adhere to stringent infection control measures, and returning specific items for recycling could compromise the integrity of their waste management processes, leading to potential contamination or exposure. Therefore, hospitals follow established procedures that prioritize the overall safe disposal of surgical waste in a manner that minimizes the risk of infection transmission and ensures compliance with health and safety guidelines.

Sending a used Galaxy II back to JUNE Medical for recycling is not an option for hospitals.

Option 2: Change materials

Regulations play a crucial role in the medical device industry, ensuring the safety and efficacy of products used in healthcare settings. These regulations often impose limitations on the changes that can be made to medical devices. This is because any modifications to a medical device, including its materials, design, or functionality, may have significant implications for patient safety and product performance. Manufacturers must comply with rigorous regulatory requirements, such as those set by regulatory bodies like the U.S. Food and Drug Administration (FDA) or the European Medicines Agency (EMA). Furthermore, medical devices often utilize specialized medical-grade plastics that are subject to special approvals and certifications.

These plastics undergo thorough testing and evaluation to ensure they meet the stringent standards for biocompatibility, chemical resistance, and durability required in medical applications. These regulatory measures help to maintain the integrity and reliability of medical devices, safeguarding patient health and maintaining the high standards of the healthcare industry. Changing materials is a long term process, and is expensive. Not a single one of customers surveyed were prepared to pay more for a biodegradable material, especially not in the UK as the device would still be sent to incineration. This means the only benefit would be to use a material that burns “better” with less emissions than 62g of terlux™which is untraceable once incarcerated as it is such small amounts in the facilities.

The cost-benefit calculations do not support changing materials.

Strength and sterilisation

Medical device sterilization methods, while crucial for ensuring patient safety, can have potential effects on the materials used in these devices. Certain sterilization methods, such as high-temperature steam sterilization, ethylene oxide (EtO) sterilization, and gamma irradiation, can contribute to material degradation. These processes can cause changes in the molecular structure of the materials, leading to brittleness and reduced strength.

The exposure to high temperatures, chemicals, or ionizing radiation can weaken the bonds within the materials, resulting in a loss of mechanical properties. This can be a concern, particularly for medical devices that rely on strength, flexibility, and durability for their intended use. To mitigate this, manufacturers carefully select materials that are compatible with specific sterilization methods or employ additional protective measures, such as incorporating additives or utilizing materials designed to withstand sterilization processes while maintaining their integrity.

Ensuring the balance between effective sterilization and maintaining the required material properties is a critical consideration for medical device manufacturers to ensure the safety and performance of their products.

Improvements made: Simplified packaging

Using plain boxes without printing on them can be advantageous for the environment in several ways. Firstly, the absence of printing reduces the need for ink and dyes, which often contain harmful chemicals and require energy-intensive manufacturing processes. By opting for plain boxes, we can minimize the release of potentially toxic substances into the environment. Secondly, printed boxes often go through additional production steps, such as graphic design, printing, and coating, all of which require additional resources and energy. By eliminating these steps, we can reduce energy consumption and carbon emissions associated with the production process. Lastly, plain boxes can be easily recycled or reused since they lack additional coatings or prints that complicate the recycling process. This promotes a more circular economy and reduces waste sent to landfills. Ultimately, choosing plain boxes without printing is a simple yet effective way to minimize the environmental impact of packaging materials.

Ugly but proud

While reused shipping boxes may not have the pristine appearance of brand-new ones, their environmental benefits far outweigh any aesthetic concerns. Reusing shipping boxes significantly reduces the demand for new box production, conserving valuable resources like trees, water, and energy. By extending the life of these boxes, we can reduce the overall waste generated and decrease the environmental impact associated with their manufacturing and disposal.

Additionally, reusing boxes prevents them from ending up in landfills, where they contribute to the growing waste problem. Embracing the reuse of shipping boxes promotes a more sustainable approach to packaging, aligning with the principles of the circular economy. So, even if reused shipping boxes may not be the most visually appealing, their positive impact on the environment makes them a responsible choice.

JUNE Medical launched the Ugly But Proud Campaign already in 2019.

Less product airmiles

Manufacturing medical devices in the UK, rather than flying them in from China, offers numerous benefits for both Europe and the USA. One key advantage is the reduced distance between the UK and European countries, such as the Netherlands, compared to the distance between China and Europe. The proximity of the UK to Europe means that transportation of medical devices can be done more efficiently, requiring shorter travel distances and reducing the associated carbon emissions. For instance, the distance from China to the Netherlands is approximately 8,000 kilometers, while the distance from the UK to the Netherlands is significantly shorter, around 500 kilometers. This substantial reduction in transportation distance results in fewer carbon emissions and a lower environmental impact.

Less transport offers several environmental advantages. Firstly, reduced transportation distances mean less fuel consumption, resulting in lower emissions of greenhouse gases such as carbon dioxide (CO₂), which contribute to climate change. Secondly, shorter transport distances decrease the need for extensive logistics operations, leading to decreased congestion and traffic-related emissions. Thirdly, minimizing transport reduces the reliance on fossil fuels, which helps mitigate the depletion of non-renewable resources. Lastly, localized manufacturing promotes a more sustainable supply chain by reducing the environmental footprint associated with the transportation of raw materials and finished products. By manufacturing medical devices in the UK and avoiding long-distance flights from China, both Europe and the USA can significantly decrease CO₂ emissions and foster a more environmentally friendly approach to healthcare supply chains.

USA: The distance between Miami (Miami International Airport) and Beijing (Beijing Capital International Airport) is 7771 miles / 12506 kilometers / 6753 nautical miles.

Europe: The distance between London (London Heathrow Airport) and Beijing (Beijing Capital International Airport) is 5080 miles / 8175 kilometers / 4414 nautical miles.

A saving of approx. 1/3 in miles when shipped from London

Less staff travel

The transition of June Medicals to conducting online Teams call meetings with surgeons and staff instead of traditional face-to-face interactions has had a significant positive impact on reducing CO₂ emissions and is inherently better for the environment.

The reduction of travel, such as driving or flying, for in-person meetings has resulted in a substantial reduction in carbon dioxide (CO₂) emissions. Travel-related emissions, particularly from air travel, are a significant contributor to greenhouse gas emissions. By adopting online meetings, June Medicals has effectively minimized the need for employees and customers to commute or fly to meet physically. This reduction in travel-related emissions has resulted in a direct decrease in CO₂ emissions, leading to a positive environmental outcome.

Furthermore, online meetings also contribute to a decrease in indirect environmental impacts. For instance, the use of virtual meetings significantly reduces the consumption of fossil fuels required for transportation. The production, refining, and distribution of fossil fuels are associated with various environmental issues, including air and water pollution, habitat destruction, and climate change. By minimizing the need for transportation, online meetings indirectly help mitigate these detrimental effects and conserve natural resources.

Additionally, online meetings have a cascading effect on reducing resource consumption. Traditional face-to-face meetings often involve significant logistical arrangements, including the booking of venues, provision of refreshments, and printing of materials. These activities consume substantial amounts of energy, paper, and other resources, leading to additional environmental impacts. By shifting to online meetings, June Medicals has eliminated or drastically reduced these resource-intensive processes, resulting in a more sustainable and eco-friendly approach.

Moreover, online meetings enable enhanced collaboration and information sharing, which can further reduce the environmental footprint. With the use of digital platforms, surgeons and staff can easily exchange documents, images, and videos in real-time, eliminating the need for physical copies or shipments. This streamlined information sharing not only saves resources but also reduces waste generation and associated environmental impacts.

Lastly, the adoption of online meetings aligns with the broader global movement towards sustainable practices and reduced carbon footprints. By demonstrating their commitment to environmental responsibility, June Medicals sets an example for other organizations and encourages the wider adoption of digital communication platforms. As more companies embrace online meetings, the cumulative reduction in CO2 emissions can be substantial, contributing to the global efforts to combat climate change and preserve the environment.

The transition of June Medicals to online Teams call meetings with surgeons and staff has had a profound positive impact on reducing CO2 emissions and is more environmentally friendly. The elimination of travel-related emissions, decreased resource consumption, streamlined collaboration, and promotion of sustainable practices collectively contribute to this positive outcome. By embracing online meetings, June Medicals demonstrates its commitment to environmental responsibility and sets an example for others to follow, ultimately helping to create a more sustainable future.

Cost implications of Greener Galaxy II

Hospitals face significant cost pressures due to various factors, and the COVID-19 pandemic has only exacerbated these challenges. Healthcare costs have been skyrocketing in recent years, and the pandemic has further strained hospital finances. Hospitals have experienced increased expenses due to the need for additional staffing, personal protective equipment (PPE), testing supplies, and medical equipment to meet the demands of the crisis. Additionally, the cancellation or postponement of elective procedures, which are typically a significant revenue source for hospitals, has resulted in substantial financial losses.

Furthermore, the increased demand for healthcare services, including testing, vaccinations, and COVID-19 treatments, has placed a tremendous burden on hospitals. These factors, coupled with the rising costs of medical supplies and technologies, have created a perfect storm for hospitals, leading to unprecedented financial pressures. As a result, hospitals are seeking ways to optimize their operations, improve efficiency, and explore cost-saving measures to navigate these challenging times and continue providing quality care to patients.

Paying higher prices for a device like Galaxy II is not feasible and none of the customers surveyed in UK, USA and Sweden were prepared to pay a premium for a greener retractor.

20 ways to reduce carbon footprint in healthcare:

1. Improve energy efficiency in healthcare facilities by upgrading equipment, optimizing HVAC systems, and using energy-saving technologies.
2. Implement renewable energy sources such as solar panels or wind turbines to power healthcare facilities.
3. Adopt energy management systems to monitor and control energy usage in real-time.
4. Encourage telemedicine and remote consultations to reduce patient travel and associated emissions.
5. Promote sustainable transportation options for staff, patients, and visitors, such as carpooling, cycling, or using electric vehicles.
6. Optimize waste management processes, including recycling, composting, and proper disposal of hazardous materials.
7. Reduce water consumption by implementing efficient plumbing systems and promoting water-saving practices.
8. Minimize paper usage through digitization, electronic medical records, and online communication platforms.

9. Implement green procurement practices, favoring environmentally friendly products and suppliers.
10. Improve the energy efficiency of medical equipment, such as imaging devices and laboratory instruments.
11. Implement sustainable building designs and construction practices for new healthcare facilities.
12. Encourage sustainable food options in hospitals, such as locally sourced and organic meals.
13. Develop and enforce sustainable pharmaceutical procurement practices, including proper disposal of unused medications.
14. Promote sustainable anaesthesia practices to minimize the environmental impact of anaesthesia gases.
15. Implement waste heat recovery systems to capture and reuse heat generated in healthcare facilities.
16. Educate staff and patients about sustainable practices and the importance of reducing CO2 emissions.
17. Invest in research and development for green healthcare technologies and innovations.
18. Collaborate with suppliers and manufacturers to develop more sustainable healthcare products and packaging.
19. Engage in carbon offset programs to compensate for unavoidable emissions.
20. Establish sustainability committees and initiatives within healthcare organizations to drive continuous improvement in reducing CO2 emissions.

By implementing these measures, healthcare facilities can significantly reduce their carbon footprint and contribute to a more sustainable healthcare sector.

2019 Climate Emergency Pledge

On Tuesday 19th November 2019, JUNE Medical Ltd declared a climate emergency and set ambitious goals to work towards being carbon neutral by 2025.

The declaration publicly acknowledges that we, as suppliers to the NHS and private healthcare providers, recognise **climate change is a threat to public health and that of our customers and their patients**. As such, we seek to minimise our own impacts on the environment and those of our suppliers and contractors.

The declaration is reinforced by the recently published NHS Long Term Plan which aims to improve air quality by cutting business mileage by 20% by 2023/24 and improving air quality by using zero/low emission vehicles in the delivery of our products and services.

The plan also sets out requirements to deliver best practice in efficiency standards and the adoption of new innovations to reduce waste, water and carbon, in addition to reducing single-use plastics while maintaining patient safety and optimal cost efficiency, throughout the supply chain.

As a result, JUNE Medical has pledged to act on:

- single-use plastics in our offices
- recycling and disposal of waste
- energy use for heating and lighting

- energy from sustainable sources
- water use
- vehicle emissions from staff travel and goods deliveries
- sustainable food sourcing

Conclusion

June Medical's Galaxy II self-retaining surgical retractor exemplifies the healthcare industry's continuous efforts to minimize environmental impacts. With its reduced plastic usage, the Galaxy II showcases a sustainable alternative to traditional surgical retractors.

Additionally, the responsible management of surgical waste through incineration not only disposes of waste effectively but also generates renewable energy for heating homes. Furthermore, the stringent cleaning processes in place ensure that emissions from incineration are within regulatory limits, safeguarding the environment and public health. Less plastic, less waste and less environmental impact.

By embracing even small advancements, healthcare professionals and institutions can make a significant contribution to a greener future by switching to Galaxy II from other retractors.

June Medical has been Carbon Neutral since 2018, and will continue to work tirelessly towards a greener planet and making surgery safer and easier across the globe.