INFLATABLE CRANIOFACIAL PROTECTOR

Introduction

Pressure ulcers are a common issue in healthcare, particularly during surgeries and long-term treatments, as prolonged pressure impairs blood flow, damaging the skin and underlying tissues. Surgeries requiring complex positions, like prone, lateral, Trendelenburg, or anti-Trendelenburg, heighten the risk for pressure ulcers, especially in craniofacial areas such as the eyes, nose, ears, and skull.

Current protective measures, like gel pads and cushions, aim to distribute weight but have limitations, including poor adaptability to individual anatomy and instability during procedures. This leads to increased morbidity, longer hospital stays, reoperations, and higher healthcare costs.

There is a critical need for a specialized craniofacial protection device that adapts to each patient's anatomy, offers precise protection, and remains stable across surgical positions to prevent pressure-related injuries and improve patient outcomes.

Product

The proposed **inflatable craniofacial protector** revolutionizes craniofacial protection by addressing these challenges. The device is meticulously designed with two layers to ensure adaptability and protection:

- **First layer - cushioned base (balaclava-like design)**:
  - A breathable, elastic fabric with soft, cushioned padding strategically positioned to protect high-pressure areas such as the forehead, cheekbones, nose bridge, chin, occiput, and temporal regions.
  - This layer conforms to the craniofacial anatomy and ensures that the device remains securely in place without slipping.

Note: The image 1 shown is a possible representation of the first cushioned layer.

- **Second layer - modular pneumatic chambers**:
  - Adaptable, inflatable pneumatic chambers are placed over the first cushioned layer.
  - These chambers can be customized for targeted pressure redistribution, ensuring optimal protection for specific areas of the face and head during different surgical positions.
  - Chambers can be added or removed as needed and inflated according to the surgical requirements.

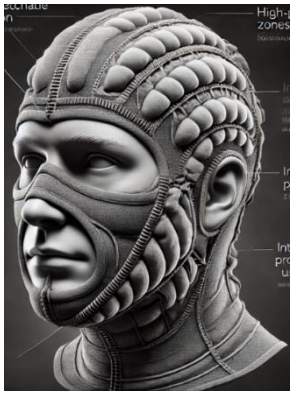

Image 1. Prototype design.

This innovative two-layer system ensures comprehensive craniofacial protection while minimizing the risk of pressure ulcers.

Furthermore, the device can be applied while the patient is awake, guaranteeing that no pressure points or sensitive areas are left unprotected before surgery. It minimizes the need for repositioning during procedures, enhancing operational efficiency and patient safety.

State of the invention

The prototype design is currently available and undergoing evaluation.

Advantages

The inflatable craniofacial protector offers several key advantages over current devices:

- **Adaptation to the patient**, not the other way around: Ensures a precise fit to the craniofacial anatomy.
- **Two-layer protection**: the cushioned base conforms to the anatomy, while modular pneumatic chambers provide customizable pressure relief.
- **Customizable protection**: pneumatic chambers can be inflated or deflated as needed.
- **Stability**: the device remains securely in place during repositioning.
- **Comprehensive protection**: effective in multiple surgical positions (prone, supine, lateral).
- **Endotracheal tube support**, preventing airway compression or obstruction.
- **Reusable and washable**: economical and sustainable.
- **Improved patient safety**: reduces pressure ulcer incidents and minimizes complications.
- **Reduces morbidity, hospital stays and healthcare costs**.

Protection

A Utility Model has been applied for at the Spanish Patent and Trademark Office with priority date November 20, 2024, and application number U202432152.

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