

# Delivering safety and comfort in theatre with reusable patient return electrodes

Electrosurgery is involved in 80% of all surgical procedures. While it is a practical and effective method for achieving homeostasis, electrosurgery is generally considered one of the most hazardous technologies in the OR



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Advances in technology have led to electrosurgery becoming safer. But many serious burns, especially in relation to passive or return electrodes, continue to occur. The primary purpose of the return electrode is to remove the current from the patient and return it to the generator, which completes the electrical circuit and prevents heat build up and subsequent burns to the patient. However, the risk of burns is increased if the return electrode contact area is minimised, creating an area of high-current density that can cause burns to the patient.

In 1981, return-electrode contact quality monitoring (RECQM) was developed as a way to safely disperse the electricity from the body and help prevent pad-site burns. The RECQM circuit measures the quantity and quality of the tissue in contact with the pad. If an unsafe pad contact is encountered, the generator goes into alarm mode and switches off. Although an improvement, these small adhesive "peel-and-stick" pads still pose the possibility of heating beneath the pad leading to a pad-site burn.<sup>1</sup>

In addition to the potential heat buildup, disposable peel-and-stick electrodes can also pose additional risks such as skin irritation, skin tears and the problem of where the pad can be safely applied. For example, guidelines from the Association of periOperative Registered Nurses (AORN) state: "Return electrodes should not be placed over bony prominences, scar tissue, hairy surfaces, areas distal to tourniquets, and on pressure points as this can impede electrosurgical return current flow."<sup>2</sup>

## Providing patient safety and peace of mind

Cromwell hospital is an internationally recognised centre of excellence and has earned a reputation in the UK as the country's most prestigious and technologically advanced independent medical and surgical care facility. Renowned for its liver, cancer, cardiac and neurosciences specialties, Cromwell houses four operating theatres – including a paediatric theatre – and offers in-vitro fertilisation (IVF) and fertility treatment programmes.

For electrosurgical procedures at Cromwell, patient safety is a foremost priority. To help ensure the safety of its patients during electrosurgery, Cromwell is employing the uniquely designed Mega Soft™ (Megadyne) patient return electrode featuring capacitive coupling. This provides the hospital staff with the ease of use associated with a capacitive pad, and an innovative design that provides patients with both comfort and safety.

Capacitive coupling can be defined as the flow of current through a capacitor. A capacitor is essentially two metal plates separated by an insulator. During monopolar electrosurgery the patient is very conductive and can be viewed as one plate in the circuit. The other plate in the circuit is the conductive material found within the capacitive pad. With the innovative patented design providing a higher impedance per area, a level of safety equal to or exceeding that of monitoring style gel pads (ie, RECQM) can be achieved.

The Mega Soft reusable patient return electrode pad is essentially a large, single conductive material sandwiched by two sheets of pressure reducing Akton Polymer. The conductive portion of the pad is the other plate of the capacitor. Due to the oscillating high-frequency nature of the current flow, current flow is induced from the patient to the pad, safely exiting the current from the patient to prevent heat build up under the pad and the possibility of a burn. The pressure reduction portion of the pad also helps to reduce the formation of pressure sores.

## "A reusable technology can also help to improve the environment – and a hospital's bottom line"

It provides the convenience of a two-in-one product that benefits our patients and staff alike – but mainly our patients. We have the peace of mind that we are providing the safest service and care possible for our patients.

### Enhancing patient comfort

Every patient attending the operating theatre will at some stage be at risk of developing a pressure sore. Pressure ulcers are defined as lesions on any skin surface that occur from unrelieved pressure and result in damage to the underlying tissue.

Prevalence studies carried out at one UK teaching hospital found that between 40% and 64% of patients with a pressure ulcer had been to theatre and had major surgery.<sup>3</sup> In the US, more than €1.02 billion is spent annually treating pressure sores. An extensive study – surveying 104 facilities and 1,128 patients after surgery lasting at least three hours – identified a rate of 8.5% of all surgical patients developing pressure ulcers.<sup>4</sup>

The surgical staff at Cromwell view pressure relief as very important in surgical procedures. The stress placed on pressure points during a lengthy procedure can put patients at a higher risk for pressure sores. We have found that an internal pressure-reduction pad decreases the pressure, shear and friction during lengthy surgical procedures to help prevent the development of pressure sores.

### Saving time and resources

Cromwell's surgical staff are benefiting by saving a significant amount of surgical prep. Time spent shaving and locating well-vascularised placement sites without bony prominences, scar tissue, hair, metal prostheses, tattoos or areas distal to tourniquets and pressure points is eliminated. As a result, there is more time to spend on providing worthwhile patient care.

Additional time can also be saved in the operating theatre. Procedures are often delayed when the surgical team stops as a nurse works around the surgical table to identify a site to apply the sticky electrode pad, and then redrape the surgical area. With Mega Soft there are no delays. Patients who are placed onto the return electrode are grounded and ready for electrosurgery at any point if it becomes necessary during the scheduled procedure.

### Cost-conscious and environmentally friendly

A reusable technology can also help to improve the environment – and a hospital's bottom line. It eliminates the expense incurred by throwing out peel-and-stick return pads. In our operating theatres, eliminating peel-and-stick pads has significantly reduced our waste disposal budget and it has made our practices better for the environment.

### A tradition of excellence

Our goal at Cromwell is to make people better in an environment that is safe and caring, with London's leading doctors, state-of-the-art equipment and highly trained staff. This year, we celebrate 25 years of providing outstanding patient service and care. The reusable patient electrode pad is just one of the indispensable, state-of-the-art technologies helping us to consistently deliver a high standard of excellence for our patients and staff. ●

### References

1. ECRI. Higher currents, greater risks: preventing patient burns at the return-electrode site during high-current electrosurgical procedures. *Health Devices* 2005;34: 273-87.
2. AORN. *Standards, recommended practices, and guidelines*. Denver: AORN; 2006.
3. Dealey C. Monitoring the pressure sore problem in a teaching hospital. *J Adv Nurs* 1994;20:652-9.
4. Aronovitch SA. Intra-operatively acquired pressure ulcer prevalence: a national study. *Adv Wound Care* 1998;11 Suppl 3:8-9.

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