



BSD-500

for local superficial and interstitial hyperthermia

How can we improve the cancer treatment results?

BSD-500

- Portable medical device, no shielding room needed
- Indicated for more than 10 different clinical applications
- FDA approved for palliative treatment of certain tumors
- Delivers both superficial and interstitial hyperthermia

Local hyperthermia in clinical cancer care consists in increasing the temperature of a neoplastic tumor to the temperatures in range of 38-43°C. Its effectiveness, in a nutshell, is due to the following properties:

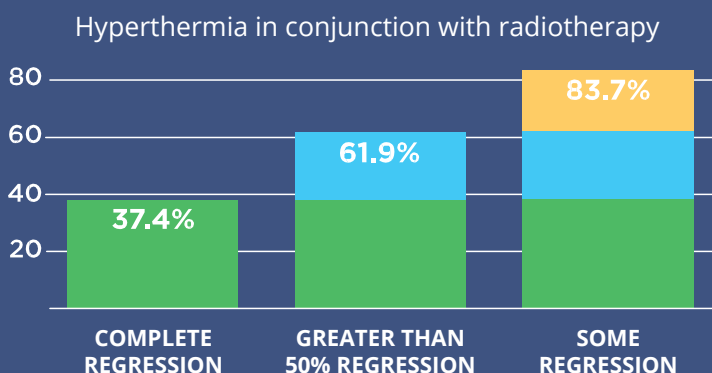
- High temperature cytotoxicity to tumor tissue.
- Sensitization effect to radio- and chemotherapy.
- Immunostimulating effect of fever temperature range (e.g. effect on heat shock proteins).

Clinically proven benefits of hyperthermia

Countless articles published by researchers and clinicians documenting the beneficial effects of adding local hyperthermia to radiotherapy and/or chemotherapy are available in the open access of the International Journal of Hyperthermia.

According to these publications, the benefits of using hyperthermia in oncology, in short, are as follows:

- Improved and extended tumor control.
- Significantly higher success rates for combined treatment of chemotherapy and radiotherapy with hyperthermia.
- Tumor size reduction so that it can be removed surgically.
- Direct destruction of tumor cells via apoptosis, especially in treatment-resistant tumors.
- Increased remission rates and improved quality of life.
- Long-term improvement in the course of the disease.
- Reduction of the risk of metastasis.



Source: Pyrexar Medical based on selected clinical trials



Clinical Studies using hyperthermia systems in conjunction with radiation therapy have shown that 37.4% of patients had a complete tumor regression, an additional 24.5% had a greater than 50% tumor regression and a total of 83.7% of patients had some tumor regression after hyperthermia therapy. The primary types of tumors included in this study were recurrent chest wall, recurrent head and neck, recurrent melanoma, and recurrent sarcoma.

Although hyperthermia has the potential for producing a variety of adverse effects, those regularly observed during clinical studies have been limited to the direct effects of heating upon tissue and indirect effects related to the tumor including burns (9.9%), pain (8.4%), ulceration (3.6%), and infection (1.8%).

Main indications for treatment with BSD-500

- Breast cancer
- Head & Neck
- Skin tumors
- Malignant melanoma
- Prostate cancer
- Tumors of the smaller pelvis area (cervix, rectum, anus, bladder, etc.)
- Esophageal cancer
- Sarcomas and lymphomas

BSD-500 - Superficial and interstitial hyperthermia system



915 MHz Eight-Channel Power Amplifier

Multi-channel solid state amplifier producing an available 480 Watts of RF power, (60 watts per channel) with independently adjustable phase and amplitude.

24" Medical Grade Touch Screen Monitor

High resolution monitor providing easy access to user control systems for improved patient monitoring and system control.

Interchangeable Superficial Applicators

Applicators available in multiple configurations to treat a range of tumor sizes and locations. Base model includes, among others, the MA-100 wave guide as shown.

5-Point Pneumatic Applicator Arm

Provides rock-steady placement of Hyperthermia applicators at any angle with a total reach of 41".

Brachytherapy Treatment Support

Interstitial hyperthermia delivers heat directly to the site of the tumor via brachytherapy catheter. The microwave power delivered to the interstitial antennas can be adjusted in amplitude and phase to conform the heating pattern to the tumor.

8-port Temperature Monitoring

Track up to 8 independent temperature probes for accurate thermal dosing. An integrated temperature well ensures easy and accurate temperature calibration.

Water Circulation System

Provides constant volume water supply to the Applicator Bolus with temperature range of 5 °C to 45 °C.



Superficial Applicators

Applicator Type	Model Number	Recommended Freq (MHz)	Typical Power (W)
Side-loaded waveguide	MA-100	915	100
Mini dual-ridge waveguide	MA-151	915	40
Side-loaded waveguide	MA-120	915	250



MA-151: mini-dual ridge wave guide applicators have an aperture of 4 x 5 cm and individual heating patterns approximately 2.5 x 2.5 cm by 2 cm deep. Advanced annular phased array principles create a central focusing of energy, which significantly overcomes the penetration losses of the energy radiated into the body.



MA-100: side loaded wave guide applicators have a 10 x 13 cm aperture and a heating pattern approximately 8 x 10 cm by 2.5 cm deep.



MA-120: side-loaded wave guide applicator has an 18 x 24 cm aperture and a heating pattern of approximately 12.5 x 19.5 cm by 2.5 cm deep.

Interstitial applicators

Typ	Model Number	Recommended Freq (MHz)	Typical Power (W)
Interstitial antenna	MA-251	915	10
Temperature sensor	TP-100		

MA-251



TP-100



MA-251: Semi-rigid microwave interstitial applicator 1.2 mm diameter x 33cm length.

The semi-rigid MA-251 microwave interstitial applicators can be inserted into 15.5 gauge (5 French) radiation implant catheters. The heating pattern is ellipsoidal and approximately 4.5 cm in length along the applicator shaft with heating to the applicator tip. Different heating patterns can be created using arrays of up to 24 applicators with 8 independent microwave power channels. Both asynchronous and electronically controlled synchronous phase modes are provided.

Support arm

The structure of the arm, to which the superficial applicator is mounted, enables its easy positioning on the target treatment site. The arm is pneumatically assisted and is equipped with joints so that the operator can effortlessly reach any part of the patient's body with the applicator.



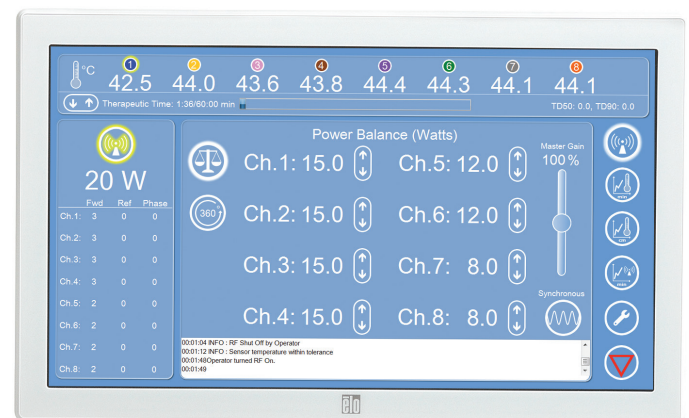
Connectors panel

All sockets for temperature probes, intra-tissue antennas and the calibration well are clearly located on the compact panel of connectors.



Monitor

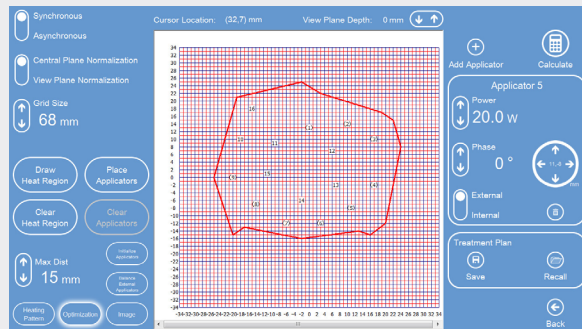
The medical touch screen located just above the connector panel provides easy and clear access to all control functions. The intuitive interface facilitates both the treatment planning process and its monitoring.



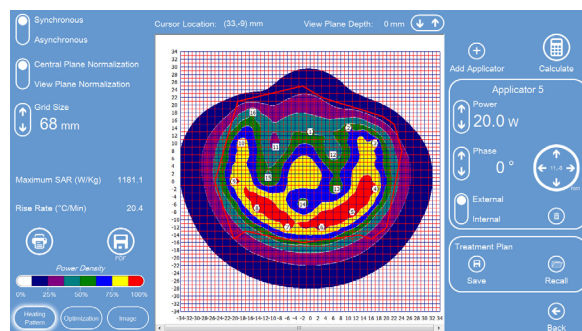
Software

Performing local hyperthermia treatment, be it superficial or interstitial, requires the use of built-in software dedicated to the BSD - 500 device. Its most important ingredients are:

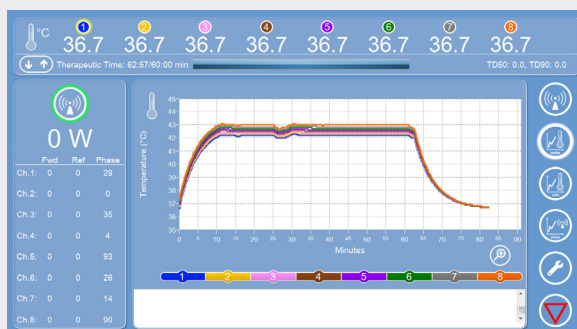
- Reliable and stable operating system developed for many years
- Procedures for treatment planning and performing
- Procedures for temperature monitoring
- Thermal dose automated computing
- Data registering and archiving
- Diagnostic tools



The treatment planning procedure is one of the key elements in ensuring the quality of any treatment. Using this software, the size and shape of the nodule can be traced and outlined on a grid on the computer screen.



The program will automatically recalculate the spatial distribution of energy each time the operator modifies the parameters of radio waves emitted by individual RF channels.



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Water circulation system

It is a portable device for medical use, which is used to ensure the circulation and appropriate temperature of deionized water in bolus of superficial applicators.

- 2-line digital LCD display
- Bolus fill/drain rate: 1.3 L per minute
- Temperature range: from 5°C up to 45°C
- Heating speed: 5,7°C/min
- Cooling speed: 1,1°C/min
- Automatic air purge



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