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# CARBON DIOXIDE THERAPY (C.D.T.)

C.D.T. consists of the therapeutic use of CO<sub>2</sub> in its gaseous state, administered by subcutaneous injection.

Since 1993 Indications of CO<sub>2</sub> injection therapy include:

Angiology: Peripheral arteriopathies / microangiopathies

Aesthetic Medicine: Paniculopatia edemato fibro sclerotica - "cellulite" and other localized adiposity (Cesare Brandi et Al. - Aesth. Plast. Surg. 2001), **skin laxity** , **stretch marks**.

Dermatology: Psoriasis, Varicose Ulcers, **Alopecia (New!)**

Plastic surgery: Improves in the **skin irregularity and post-liposuction** and as a compliment of it (Cesare Brandi et Al. - Aesthetic Plastic Surgery 2004)

Rheumatology: Acute arthritis and sports medicine

Urology: Erectile Dysfunction, associated with microangiopathy.

The therapy originated in France at the Thermal Waters Station of Royat. There, a group of cardiologists began treating patients with peripheral organic and functional arteriopathies (arterosclerotics, Buerger, Raynaud, Etc.) In 1953, the cardiologist Dr. Jean Baptiste Romuef, published a paper with its experience in 20 years of work with CO<sub>2</sub>.

In 1956 he published a second paper with 2400 cases of intermittent claudication and gangrene of the extremities treated by subcutaneous injection of an oxygen-carbon dioxide mixture (PMID 13335707). The most interesting aspect of this study is that there were no side effects noted with the administration of the gas.

By 1983, more than 402,000 patients had been treated with CO<sub>2</sub> in Royat. In 1994 alone some 20,000 new patients were treated again with no side effects. The number of patients treated with no side effects and the considerable improvement documented confirms the safety and effectiveness of this therapy.

We forget that CO<sub>2</sub> is used extensively in medicine every day; as it is a naturally occurring gas in the body and is produced by each cell as the by-product of cellular metabolism. Hundreds of scientific papers documenting its use can be found in Pubmed.

1. CO<sub>2</sub> is a non embolic gas and has no toxicity even in elevated dosages in the body. It is hemo-soluble and does not increment the arterial pressure; this is why it is used by anesthesiologists.
2. CO<sub>2</sub> is used in Laparoscopic surgeries (between 12 to 20 liters of CO<sub>2</sub>) thousands of times each day to distend the abdomen.
3. Carbon dioxide is used as an alternative contrast medium in peripheral angiography.

When our bodies are at rest they produce approximately 200 cc/min of CO<sub>2</sub>. That amount can be raised during exercise to 2 liters/min. The rate infused during CDT is 100cc/min or less and the maximum total applied is 2 liters or less; insignificant when compared to amounts used for Laparoscopic surgery.

More recently CO<sub>2</sub> is becoming a main stream therapy for cosmetic and aesthetic enhancement. More than 4,000 doctors world wide (more than 1,000 in Brazil alone) are practicing CDT. In my practice I use it for cosmetic toning of the skin, cellulite, stretch marks, facial laxity, wrinkles and the virtually impossible...tightening of the neck. In fact CO<sub>2</sub> can be used any where dermal toning is needed with good results and no secondary effects.

We use an innovative device (Carbomed produced in Italy) for the administration of CO<sub>2</sub> that regulates the flow rate, the infusion pressure and is calibrated to measure the dosage in cc. As CO<sub>2</sub> is 20 times more soluble than oxygen, it is quickly and easily diffused around the injection site (approx. 10cm-20 cm diameter. Fewer injections are required to perform the therapy than Mesotherapy. We use a 30G needle by 4mm or 13mm as determined by treating dermal laxity or fat respectively.

We treat cellulite daily as it affects 95% of the adult female population. The number one complaint reported by the American Society of Plastic Surgery post liposuction is...."Why do I still have cellulite after liposuction". Liposuction does not target the superficial adipose fat and often cellulite looks worse after a liposuction procedure. Why? We know that cellulite has its origins in microcirculatory alterations and that blood flow regulates / mediates the metabolic functions of adipose tissue. A liposuction procedure damages the underlying vascular network that feeds the superficial micro circulatory system. This is also why unless one improves the blood flow to the superficial adipose fat no amount of exercise will mobilize the fat and cellulite will persist.

After CO<sub>2</sub> is injected in the treated areas, it improves tissue perfusion by producing artery and capillary **vasodilatation** (by direct action). **This improves blood flow** - the first mechanism involved in triglyceride and FFA mobilization.

The basic protocol to improve local adiposity is 2 sessions per week, for a total of 10 to 15 sessions and the maintenance. CDT is a stand alone technique but it can be combined with all other cosmetic and surgical techniques. Results are seen after just a few sessions: quality of the tissue improves (skin texture, firmness and more homogeneous color (important in the treatment of stretch marks). However, to obtain a lasting result (6 to 12 months) it is recommended to perform at least 10 sessions.

CDT is safe, easy to perform, with no downtime, minimal short term side-effects (discomfort and a heavy feeling for 15 min, bruising at the injection site 3-4 days).

We have worked with C.D.T. for more than five years in my personal clinics and also in an international spa located inside a five star hotel - member of "The Leading Hotels of The World".

Our staff developed an innovative way to inject CO<sub>2</sub>, more superficial - we call it Meso-carboxy. This superficial injection of the gas provokes an undermining which stimulates the production of collagen and skin retraction. We use it in under the chin area, arms, neck, skin laxity, acne scar, facial rejuvenation, upper and lower eye lids and even in improving white stretch marks and old scars.

I recommend a hands-on training course to learn the details of the technique and the correct protocols to achieve results that you will be proud of and your patients will be happy with.

I have had the pleasure and honor to have trained more then 1200 medical doctors in more than 8 countries. The C.D.T. family continues to grow.

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