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Role of Biophysic Stimulation with Pulsed Electromagnetic Fields on Bone Bruise in Anterior Cruciate Ligament Reconstruction

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Disclosures:

- S.Z.: DePuy and Smith&Nephew consultant
- OTHER AUTHORS: Nothing to disclose
- IGEA S.p.A. provided I-One® devices

Introduction and methods.

INTRODUCTION

Pulsed electromagnetic fields (iOne®, IGEA S.p.A, Italy) effectiveness in inflammation modulation and articular homeostasis promotion has been widely demonstrated in *in-vitro* and *in-vivo* on animal models research.

The primary goal of this study was to evaluate the effectiveness of iOne® in reducing post-operative pain (measured by VAS score) after anterior cruciate ligament (ACL) reconstruction associated with tibial and femoral bone bruise (BB) when applied at least for 4 hours a day, 15 days before and 2 months after surgery.

Secondary goals were quantification of the BB area dimensional reduction (measured by WORMS scale), improvement in knee functional outcomes (measures by IKDC, KOOS and TEGNER scores), and global health condition (measured by SF-12 score).

	CONTROLLO		I-ONE		
	media	dev.st.	media	dev.st.	*p value*
AGE	26.5	10.6	25.9	8.2	0.8597
HEIGHT (m)	1.75	0.09	1.74	0.08	0.9090
WEIGHT (KG)	71.3	10.6	71.3	16.0	0.9982
BMI	23.3	2.7	23.4	4.9	0.9620
SMOKER (YES/NO)	3/17		5/12		0.4283
Side affected (dx/sx)	9/10		7/8		1.0000

METHODS

Between 2017 and 2022, 66 patients were recruited. Inclusion criteria were: (1) Patients with complete ACL tear associated with BB, (2) aged between 15 and 55 years with (3) MRI acquired within 21 days from trauma. Were excluded from this study patients with (1) previous surgeries on the affected knee, (2) BMI >30, and (3) multi-ligament or cartilage associate lesions.

Patients were randomized into 2 groups (*treated* with iOne® and *control* group) based on sex, BB > or <1 cm, and smoking habits.

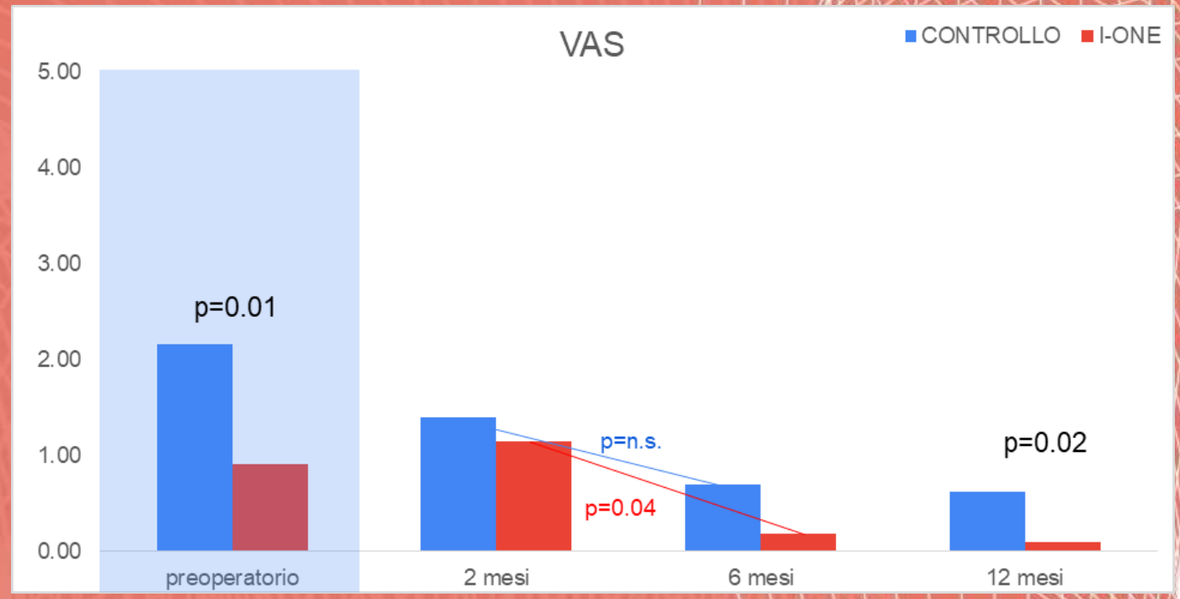
PROMs evaluations were made by VAS, TEGNER, SF-12, KOOS and IKDC scores.

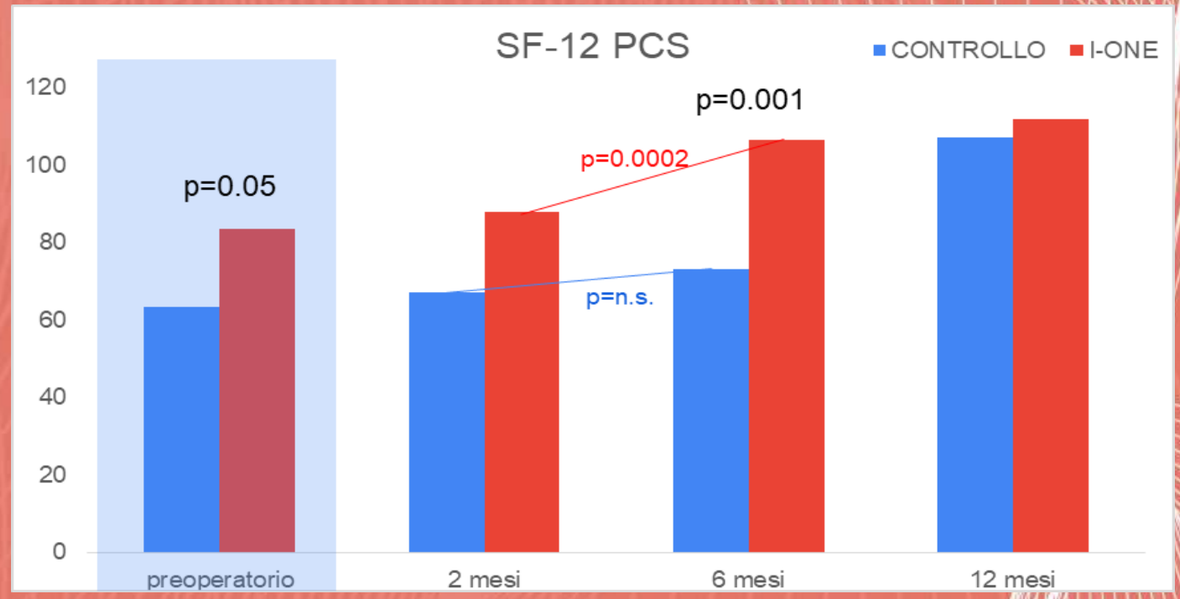
Results

Pain evaluated by VAS significantly decreased before surgery (2.16 ± 1.71 – 0.91 ± 1.02, p <0.05) and 12 months after surgery (0.63 ± 0.52 – 0.09 ± 0.30, p <0.05) in the treated group.

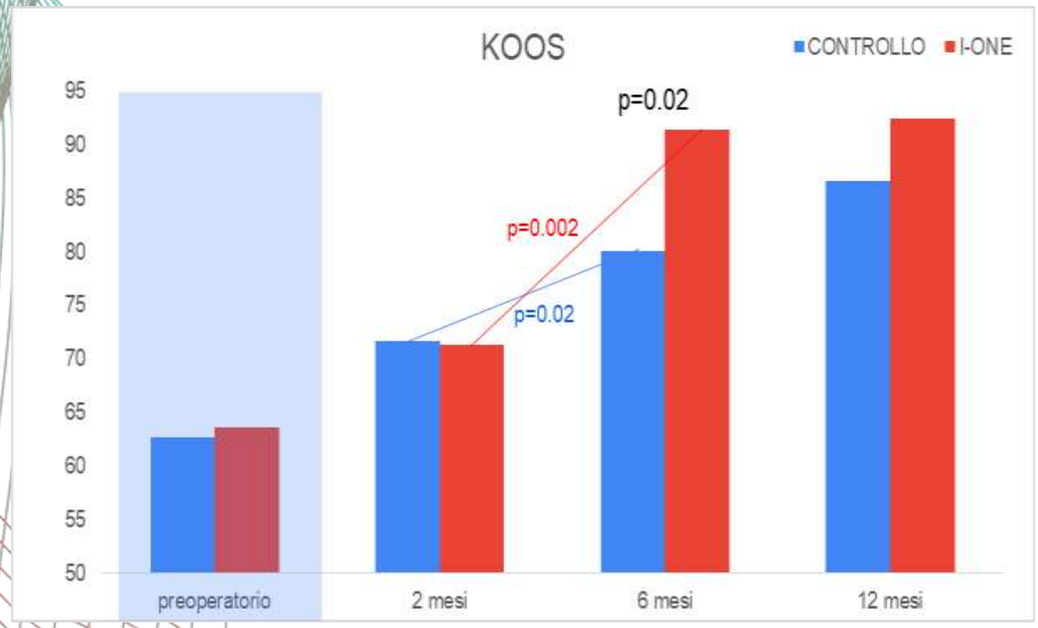
TEGNER was not significantly decreased in the treated group.

SF-12 (PCS) significantly decreased before surgery (63 ± 30 – 84 ± 28, p <0.05) and 6 months after surgery (73 ± 24 – 107 ± 19, p <0.05) in the treated group. SF-12 (MCS) was not significantly decreased in the treated group.





Results and Conclusions



RESULTS

KOOS significantly decreased 6 months after surgery (80 ± 14 – 91 ± 5, $p < 0.05$) in the treated group.

IKDC was not significantly decreased in the treated group.

CONCLUSIONS

Treatment with pulsed electromagnetic fields has proven to be viable in pre- and post-surgery pain management and in improving and accelerating functional recovery, the return to sport, and BB resorption in patients who had undergone ACL reconstruction associated with BB.

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