

Evaluation of the effects of Endermologie® on lipid mobilization and gene expression using microdialysis and DNA microarray analysis respectively

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Background: A mechanical massage technique has been recently shown to have an impact on the lipolytic responsiveness of femoral adipose tissue in women with cellulite (1). A study was necessary to validate those preliminary results when using a new main head of massage and to expand the investigations with the study of gene expression modifications in femoral adipose tissue after such a treatment.

Objective: The objective of the study was to improve mechanistic considerations on the impact of this mechanical massage technique on lipid mobilization, local blood flow changes and gene expression using whole-genome microarrays to identify global effects.

Materials and methods: Twelve healthy women volunteers with cellulite (grade ≥ 2) were included and treated with 12 sessions (2 sessions per week/6weeks) of mechanical massage technique (Endermologie®). Microdialysis has been carried out in the femoral adipose tissue in order to assess lipolytic responsiveness via glycerol determination and local blood flow changes (ethanol efflux technique) following perfusion of increasing concentrations of a lipolytic agent (isoproterenol). In addition, Agilent arrays comprising 44,000 probes were used to analyse gene expression (total RNAs were isolated using Trizol from adipose tissue biopsies). When necessary, genes changes revealed with microarrays were validated by real-time PCR. All evaluations were performed before and after treatment.

Results: Treatment of femoral adipose tissue with Endermologie® enhances the lipolytic responsiveness (+50%) and improves local blood flow in response to a beta-adrenergic receptor agonist. Microarray analysis identified 2258 differentially expressed genes (rate of false- positive: 5%): 1014 over-expressed: 938 with a ratio after / before >1.25 (ex: Type I Collagen: + 3.4; Emilin: + 2.6) and 1244 under-expressed: 836 with a ratio after / before <0.8

Conclusion: This basic research improves knowledge of Endermologie® mechanism of action and reveals new perspectives. This technique of cellular stimulation facilitates lipid mobilization as well as glycerol and fatty acid efflux from femoral fat and reveals a potent impact on gene expression (still under detailed bioinformatic analysis).

(1) Monteux C. and Lafontan M. (2008) *J. Eur. Acad. Dermatol. Venereol.*, 22(12):1465-70.