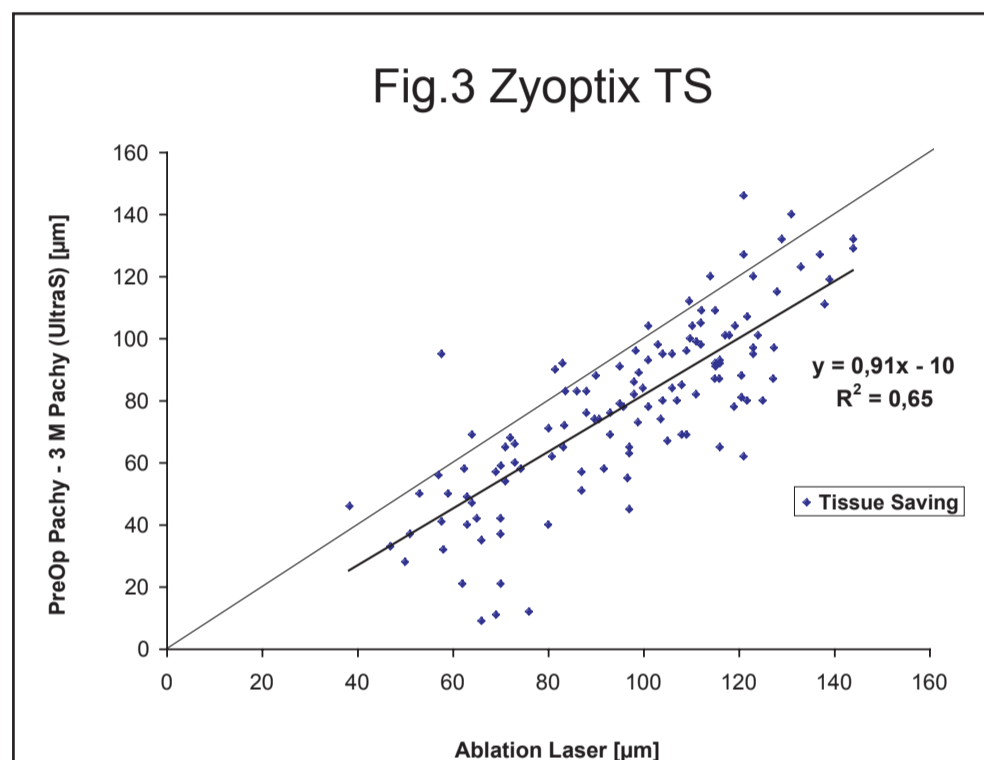
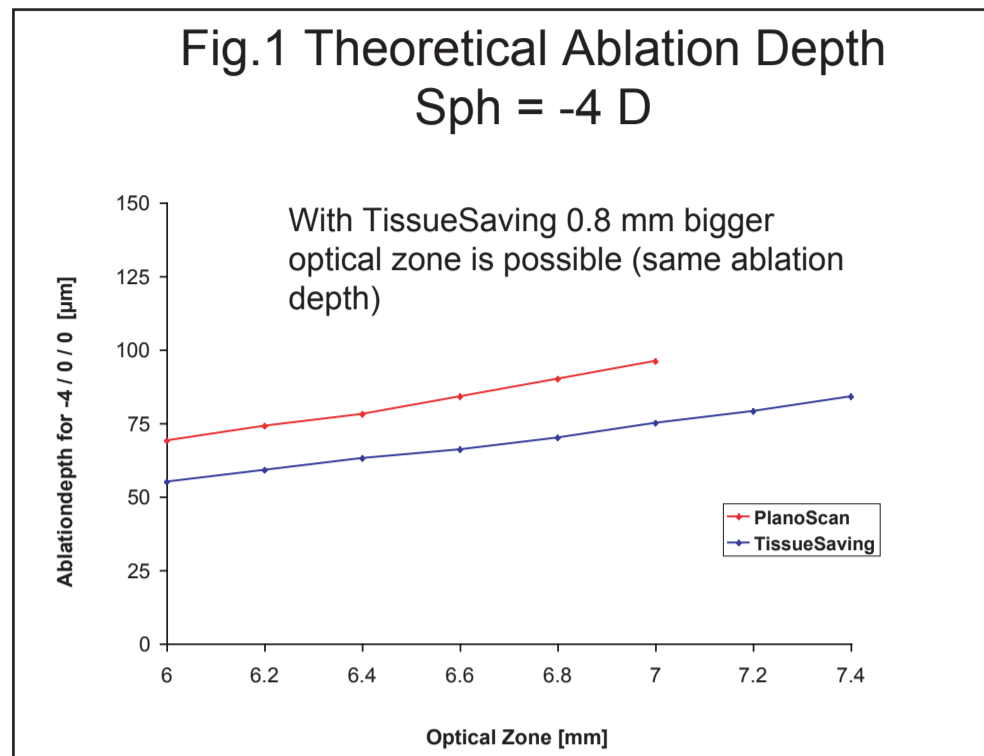


Comparison of the Bausch & Lomb LASIK Treatment Algorithms Zyoptix TissueSaving vs. PlanoScan in terms of calculated and measured ablation depth.

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4. Results:

(Fig.3) represents the treatments with Zyoptix TissueSaving. X-coordinate is the theoretical calculated maximum ablation depth and Y-coordinate the corresponding measured ablation of each single treatment. Statistical analysis indicates 10 µm of post LASIK thickening of the cornea [1]. The linear regression line having the gradient of 0.91 shows that only 91% of the calculated ablation depth is actually removed from the cornea. For the control group of the PlanoScan treatments the factor is 85% (Fig.4). Coefficient of correlation (R²) for both groups is higher than 0.5 (=significant).

Based on this measured values the ablation depth per diopter can be recalculated to get the real values of ablation depth per diopter for Zyoptix TissueSaving and PlanoScan (Fig. 5). With Zyoptix TissueSaving and 6.5 mm optical zone there is a measured ablation depth of around 14 µm per diopter. This is 20% less compared to PlanoScan and 9% less than the theoretical values.

Spherical Equivalent(Dpt) TissueSaving					
Time	Eyes	Mean	St-Dev	Min	Max
Preop	124	-3,46	0,96	-4,875	-1,25
3 Month	124	-0,10	0,45	-1,375	0,875

Sphere(Dpt) TissueSaving					
Time	Eyes	Mean	St-Dev	Min	Max
Preop	124	-3,07	1,01	-4,75	-0,25
3 Month	124	0,07	0,41	-1	1,25

Cylinder(Dpt) TissueSaving					
Time	Eyes	Mean	St-Dev	Min	Max
Preop	124	-0,78	0,61	-2	0
3 Month	124	-0,34	0,32	-1,25	0

Spherical Equivalent(Dpt) PlanoScan					
Time	Eyes	Mean	St-Dev	Min	Max
Preop	140	-3,11	1,03	-4,875	-0,75
3 Month	140	-0,17	0,42	-1,5	0,875

Sphere(Dpt) PlanoScan					
Time	Eyes	Mean	St-Dev	Min	Max
Preop	140	-2,77	1,09	-4,75	-0,25
3 Month	140	-0,01	0,44	-1	1,25

Cylinder(Dpt) PlanoScan					
Time	Eyes	Mean	St-Dev	Min	Max
Preop	140	-0,68	0,50	-2	0
3 Month	140	-0,33	0,33	-1,25	0

1. Purpose:

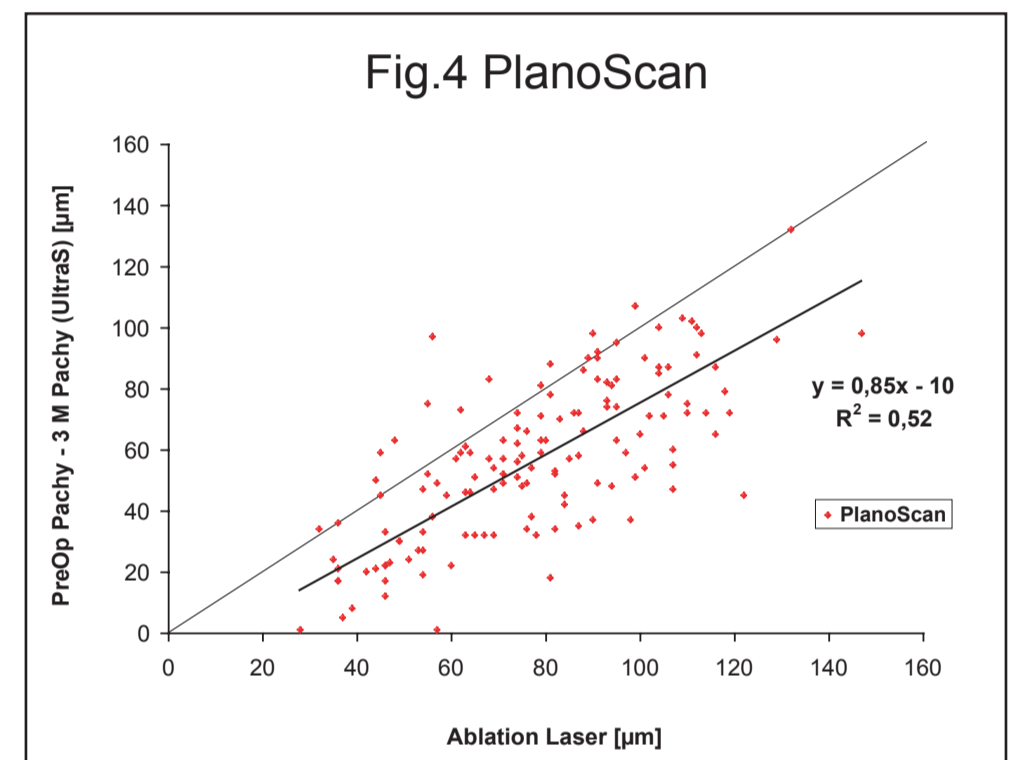
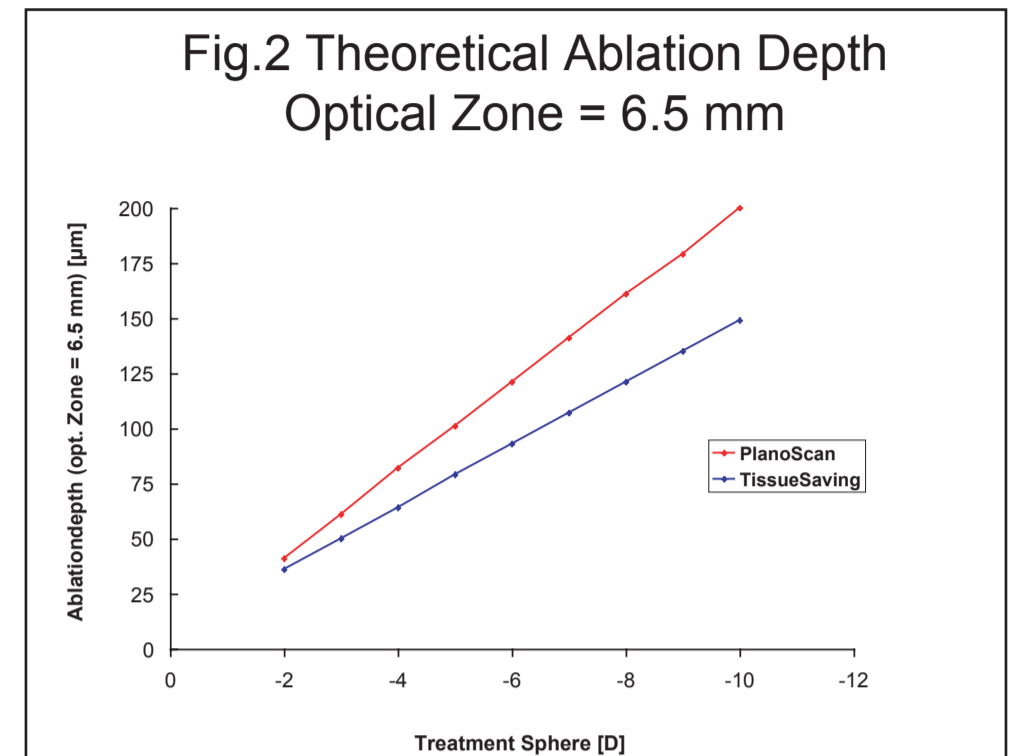
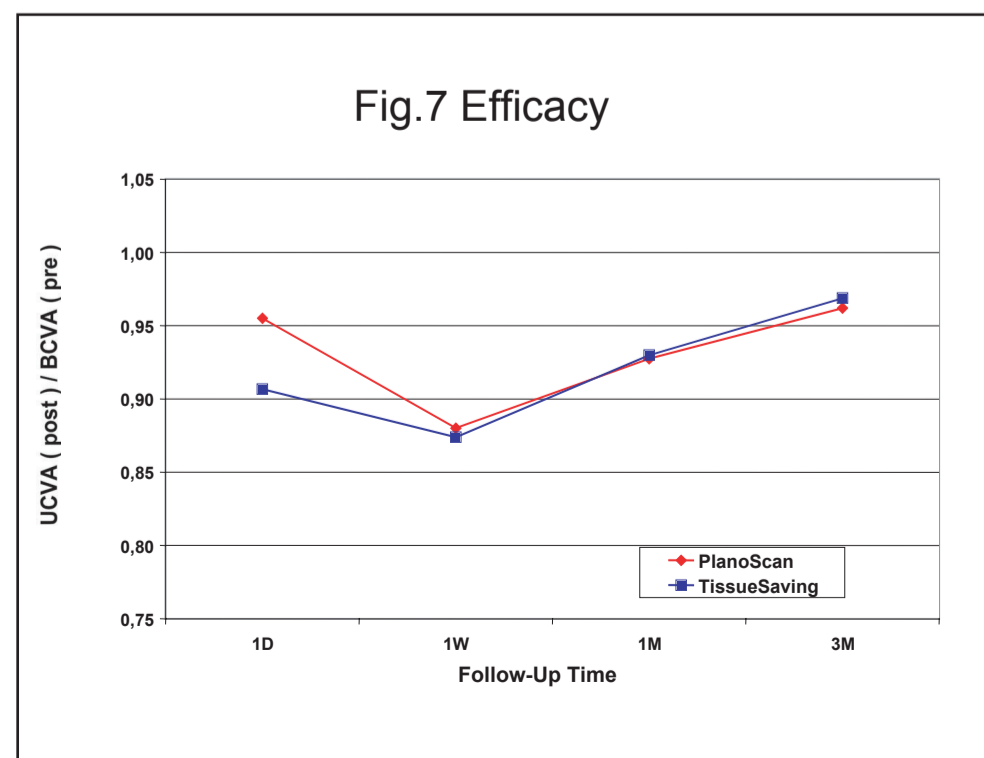
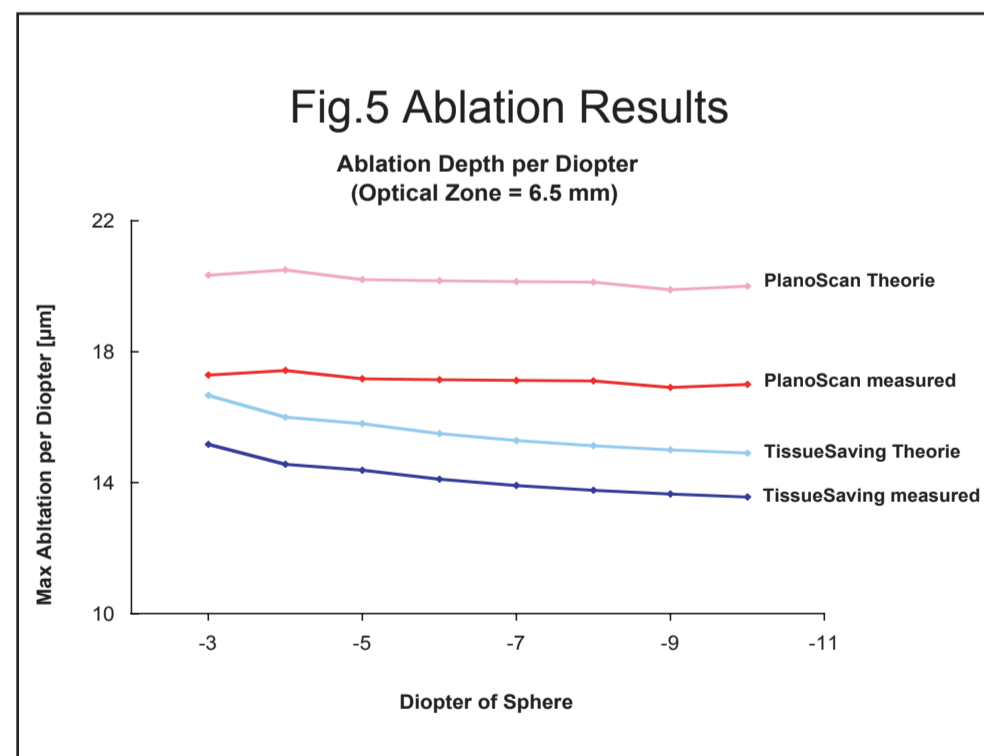
Within a retrospective randomized study 3 months LASIK follow up results are analysed. The treatments are based on two different algorithms: Zyoptix TissueSaving algorithm and PlanoScan algorithm. All surgeries were performed with the Bausch & Lomb 217z laser platform. This poster reflects the comparison of the theoretical ablation depth with the ablation depth measured with an ultrasonic system as well as the comparison of the refractive and visual acuity outcomes of the treated eyes.

2. Theory:

In theory the new Bausch&Lomb Zyoptix TissueSaving delivers about 25% tissue saving in comparison to the PlanoScan algorithm. This is shown in (Fig.1) and (Fig.2): Zyoptix TissueSaving in comparison to the PlanoScan algorithm for a spherical -4 D correction over an optical zone from 6.0 mm to 7.4 mm (Fig.1) and for an optical zone of 6.5 mm over the correction range from -2 to -10 D (Fig.2). The optimization of the ablation depth for the Zyoptix TissueSaving algorithm is mainly a result of the use of the 2mm and 1mm truncated gaussian laser beam profile.

3. Methods:

The central pachymetry is measured preoperatively and 3 month postoperatively with ultrasound Pachymetry [DGH Pachette2]. The difference of the pachymetry values represents the measured central corneal ablation depth of the LASIK procedure. This measured ablation depth is then compared to the calculated ablation depth by the laser software of each individual treatment (Fig.3 and Fig.4). Only virgin eyes and only myopic treatments (central ablation depth = maximum ablation depth) are included. Data of 124 eyes treated with the Zyoptix TissueSaving and 140 eyes treated with the PlanoScan algorithm are available. Furthermore the analysis of clinical outcome (refraction, visual acuity) of the two groups has been performed.



Completing the analysis, the refractive and visual acuity outcomes of these two groups are shown in (Fig.6, Fig.7 and Fig.8). The data show equivalent excellent outcomes. There is no undercorrection despite the lower measured ablation.

5. Conclusion:

- 1) Zyoptix TissueSaving is a reliable algorithm for LASIK with only 14 µm measured ablation depth per diopter by full corrected optical zone of 6.5 mm. Zyoptix TS saves 20% tissue compared to the PlanoScan algorithm.
- 2) Zyoptix TissueSaving overestimates the real ablation depth by 9%. This can be seen as an additional safety margin.
- 3) Data indicate a post-LASIK thickening of around 10 µm. This might be a result of epithelium thickening post LASIK [1].

[1] compare: "LASIK nomograms hide corneal biomechanical and epithelial profile changes induced by surgery" by Dan Z. Reinstein et al. escrs eurotimes, August 2002.

