Outcomes of the PreserFlo Microshunt : An Updated Systematic Review and Meta-Analysis

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INTRODUCTION

- PMS is a biocompatible subconjunctival device inserted through an ab externo approach into anterior chamber-angle, creating a new drainage pathway for aqueous humor from the anterior chamber to a posterior subconjunctival bleb 6.
- Offers a micro-invasive approach that aims to reduce IOP while minimizing the risks and complications associated with traditional trabeculectomy.

AIM

To assess the efficacy of the PreserFlo Microshunt (PMS) for treating primary open angle glaucoma.

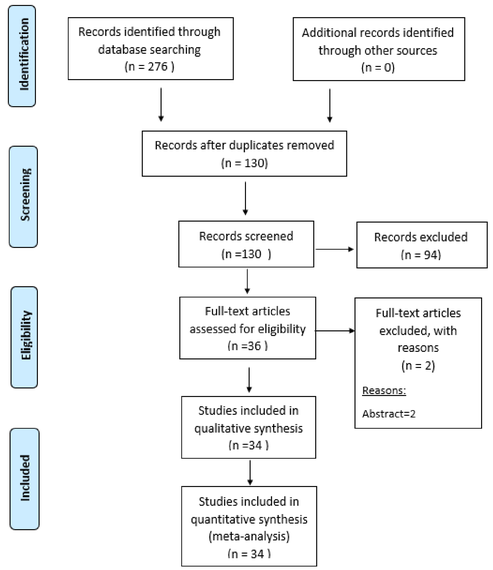
METHOD

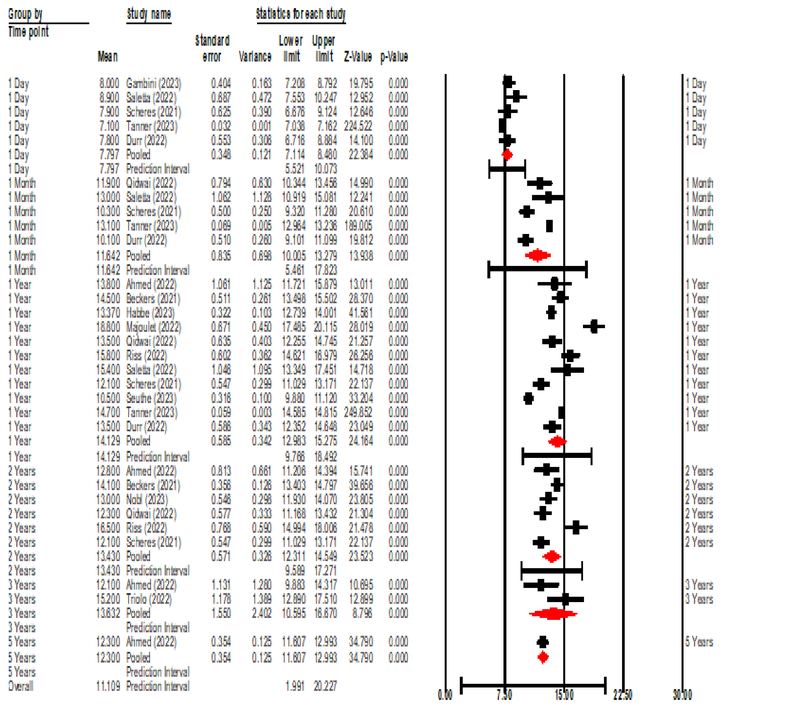
- A systematic review and meta-analysis were conducted as per the Preferred Reporting Items for Systematic Reviews and Meta-Analyses **(PRISMA) guidelines**.
- Publications in **MEDLINE, EMBASE, EMCARE, CINAHL and the Cochrane Central Register of Controlled Trials (CENTRAL)** that assessed PreserFlo efficacy with or without phacoemulsification as well as, PreserFlo versus trabeculectomy were screened for eligibility.
- **Inclusion Criteria:** All observational studies assessed PreserFlo efficacy with or without phacoemulsification as well as, PreserFlo versus trabeculectomy
- **Exclusion Criteria:** Randomized control trials (RCT), abstract only, conference literature, dissertations, and case reports.

RESULTS

34 included studies with a total sample size of **3108 eyes**

Figure 1 *Prisma Flow Diagram: The PRISMA diagram details the search and selection processes applied during the overview.*





Group by Time point	Study name	Statistics for each study					
	Mean	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
1 Day	8.000 Gambini (2023)	0.404	0.163	7.208	8.792	19.795	0.000
1 Day	8.900 Saleita (2022)	0.687	0.472	7.553	10.247	12.952	0.000
1 Day	7.900 Scheres (2021)	0.625	0.390	6.678	9.124	12.648	0.000
1 Day	7.100 Tanner (2023)	0.032	0.001	7.038	7.162	224.522	0.000
1 Day	7.800 Durr (2022)	0.553	0.306	6.716	8.884	14.100	0.000
1 Day	7.797 Pooled	0.348	0.121	7.114	8.480	22.384	0.000
1 Day	7.797 Prediction Interval			5.521	10.073		
1 Month	11.900 Qidwai (2022)	0.794	0.630	10.344	13.456	14.990	0.000
1 Month	13.000 Saleita (2022)	1.062	1.128	10.919	15.081	12.241	0.000
1 Month	10.300 Scheres (2021)	0.500	0.250	9.320	11.280	20.610	0.000
1 Month	13.100 Tanner (2023)	0.069	0.005	12.964	13.236	189.005	0.000
1 Month	10.100 Durr (2022)	0.510	0.260	9.101	11.099	19.812	0.000
1 Month	11.642 Pooled	0.835	0.698	10.005	13.279	13.938	0.000
1 Month	11.642 Prediction Interval			5.461	17.823		
1 Year	13.800 Ahmed (2022)	1.061	1.125	11.721	15.879	13.011	0.000
1 Year	14.500 Beckers (2021)	0.511	0.261	13.498	15.502	28.370	0.000
1 Year	13.370 Hatibe (2023)	0.322	0.103	12.739	14.001	41.561	0.000
1 Year	18.800 Majoulet (2022)	0.671	0.450	17.485	20.115	28.019	0.000
1 Year	13.500 Qidwai (2022)	0.635	0.403	12.255	14.745	21.257	0.000
1 Year	15.800 Riss (2022)	0.602	0.362	14.621	16.979	26.258	0.000
1 Year	15.400 Saleita (2022)	1.048	1.095	13.349	17.451	14.718	0.000
1 Year	12.100 Scheres (2021)	0.547	0.299	11.029	13.171	22.137	0.000
1 Year	10.500 Seuthe (2023)	0.316	0.100	9.880	11.120	33.204	0.000
1 Year	14.700 Tanner (2023)	0.059	0.003	14.585	14.815	249.852	0.000
1 Year	13.500 Durr (2022)	0.588	0.343	12.352	14.648	23.049	0.000
1 Year	14.129 Pooled	0.585	0.342	12.983	15.275	24.164	0.000
1 Year	14.129 Prediction Interval			9.766	18.492		
2 Years	12.800 Ahmed (2022)	0.813	0.661	11.206	14.394	15.741	0.000
2 Years	14.100 Beckers (2021)	0.358	0.128	13.403	14.797	39.658	0.000
2 Years	13.000 Nabil (2023)	0.548	0.298	11.930	14.070	23.805	0.000
2 Years	12.300 Qidwai (2022)	0.577	0.333	11.168	13.432	21.304	0.000
2 Years	16.500 Riss (2022)	0.768	0.590	14.994	18.006	21.478	0.000
2 Years	12.100 Scheres (2021)	0.547	0.299	11.029	13.171	22.137	0.000
2 Years	13.430 Pooled	0.571	0.326	12.311	14.549	23.523	0.000
2 Years	13.430 Prediction Interval			9.589	17.271		
3 Years	12.100 Ahmed (2022)	1.131	1.280	9.883	14.317	10.695	0.000
3 Years	15.200 Triolo (2022)	1.178	1.389	12.890	17.510	12.899	0.000
3 Years	13.632 Pooled	1.550	2.402	10.595	16.670	8.796	0.000
3 Years	Prediction Interval						
5 Years	12.300 Ahmed (2022)	0.354	0.125	11.607	12.993	34.790	0.000
5 Years	12.300 Pooled	0.354	0.125	11.607	12.993	34.790	0.000
5 Years	Prediction Interval						
Overall	11.109 Prediction Interval			1.991	20.227		

Figure 2: Forest plot for the standard mean difference of IOP in PMS at 1 day, 1 month, 1 year, 2 year and 3 years post-operatively. There was a statistically significant decrease in IOP throughout all the afore mentioned time intervals

Post-operative IOP:

- **1 month:** analysis of 5 studies; pooled mean IOP of 11.642 indicating a significant difference (95% CI:10.005 – 13.279, P <0.001).
- **1 year:** analysis of 11 studies; pooled mean IOP of 14.129 indicating a significant difference (95% CI:12.983 – 15.275, P < 0.001).
- **2 years:** analysis of 6 studies; pooled mean IOP of 13.430 indicating a significant difference (95% CI:12.311 – 14.549, P < 0.001).
- **3 years:** analysis of 2 studies; pooled mean IOP of 13.632 indicating a significant difference (95% CI:10.595 – 16.670, P < 0.001).
- **PMS VS. trabeculectomy:** At 1, 6 and 12 months, Trabeculectomy reveals a statistically significant advantage (MD = 0.92, CI = 0.02 to 1.81, P = 0.04); MD = 1.25, CI = 0.36 to 2.14, P = 0.006; MD = 1.54, CI = 0.32 to 2.76, P = 0.01, respectively).

Post-operative Anti-Glaucoma Medication (POAM):

- **1 month:** analysis of 3 studies; pooled mean POAM of 0.245 indicating a significant difference (95% CI:0.079 – 0.411, P =0.004).
- **1 year:** analysis of 10 studies; pooled mean POAM of 0.679 indicating a significant difference (95% CI:0.541– 0.816, P < 0.001).
- **2 years:** analysis of 7 studies; pooled mean POAM of 0.724 indicating a significant difference (95% CI:0.493 – 0.956, P < 0.001).
- **3 years:** analysis of 3 studies ; pooled mean POAM of 0.870 indicating a significant difference (95% CI:0.463 – 1.278, P < 0.001).
- **PMS VS trabeculectomy:** At 6 months, PreserFlo demonstrated a statistically significant reduction POAM , however, at 12 months, no significant difference was noted (MD = -0.18, CI = -0.29 to -0.08, P = 0.0005; MD = 0.10, CI = -0.12 to 0.31, P = 0.38, respectively)

CONCLUSION

- This study, incorporating 34 studies involving 3108 eyes, indicates that PMS is an efficacious intervention for the treatment of primary open angle glaucoma in terms of improving IOP, and POAM reduction.
- In comparison with trabeculectomy, trabeculectomy remains superior in terms of reduction of IOP while the two are comparable in terms of POAM reduction.

REFERENCES

CONTACT INFORMATION

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