Laser treatment for benign prostatic hyperplasia: a systematic review

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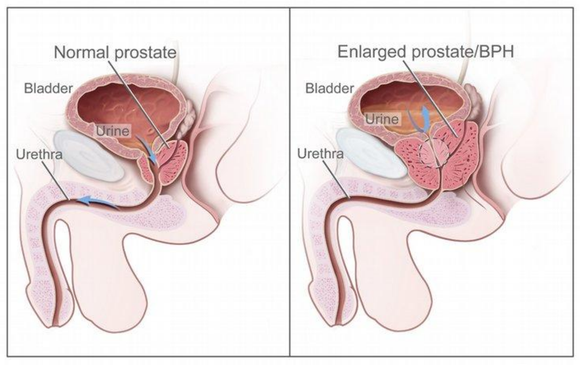
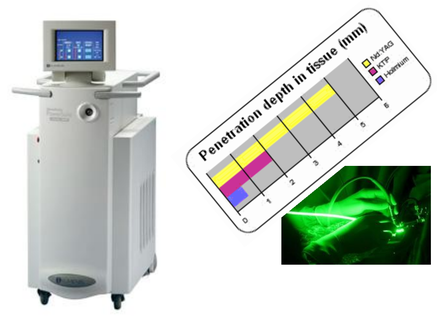
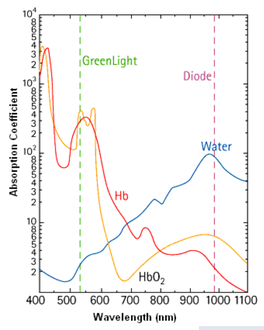
Benign prostatic hyperplasia (BPH) is one of the leading benign tumours among males over the age of 50 years. Surgical treatment aims at improving symptoms of urinary obstruction and patients' quality of life, with transurethral resection of the prostate (TURP) being the standard treatment.

To reduce TURP-related complications, new alternative treatments have been developed in recent years. Notable among these are various laser techniques.

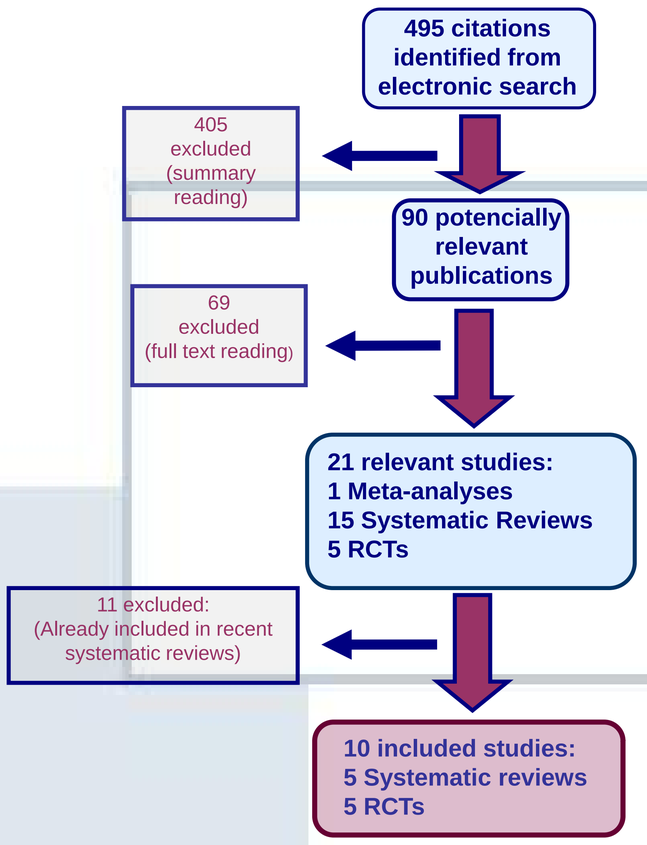






Method

A bibliographic search was conducted in February 2010, using pre-established inclusion and exclusion criteria and targeting the principal biomedical databases: Cochrane Library Plus; Database of Abstracts of Reviews of Effectiveness; Health Technology Assessment; Medline and Embase.



The objective was to undertake a systematic review of the efficacy and safety of different laser techniques versus TURP

Results

We only included rabdomized control trials (RCTs) that compared TURP to the following laser techniques, i.e., visual laser ablation of the prostate (VLAP), contact laser prostatectomy (CLAP), interstitial laser coagulation (ILC), holmium laser ablation of the prostate (HoLAP), holmium laser resection of the prostate (HoLRP), holmium laser enucleation of the prostate (HoLEP), potassium-titanyl-phosphate (KTP) and thulium laser resection of the prostate (TmLRP), though in some cases only a single RCT had been conducted. In the case of the latest laser techniques, such as high-intensity diode (HiDi) or HPS 120-W laser, no published RCTs have been retrieved to date.

Table: Summary of diffent laser techniques

Lasers techniques	Subtype	Wave-length (nm)	Power (W)	Chromophores	Penetration depth in tissue	Tissue extraction posibility	Irrigation fluid	Mode with contact/without contact	Mode pulse/continuos
Laser Nd:YAG	VLAP	1064	40-60	No selective (melanin, pigmented tissues and proteins)	5 mm	No	Saline	without contact	Continuos
	CLAP	1064	40	No selective (melanin, pigmented tissues and proteins))	5 mm	No	Saline	Contact	-
	ILC	1064	20	No selective (melanin, pigmented tissues and proteins)	5 mm	No	Saline	Contact	-
	KTP	532	80	Hemoglobin	2 mm	No	Saline	Without contact	Continuos
	LBO o HPS	532	120	Hemoglobin	2 mm	No	Saline	Quasi-contact	Continuos
Laser Ho: YAG	HoLAP	2140	60	Water	0,4 mm	No	Saline	Contact	Pulse
	HoLRP	2140	60-80	Water	0,4 mm	Yes	Saline	Contact	Pulse
	HoLEP	2140	60-100	Water	0,4 mm	Yes	Saline	Contact	Pulse Continuos
Laser Tm:YAG	-	2013	70-90	Water	0,4 mm	Yes	Saline	Contact Without contact	Continuos
Laser HiDi	-	890-1460	150-200	Water Hemoglobin	-	No	Saline	Without contact	Pulse

Both TURP and the different laser techniques assessed were shown to be effective in the relief of BPH-related prostatic symptoms with equivalent results in terms of International Prostate Symptom Score (IPSS), maximal urinary flow rate (Qmax) and reduction in postvoid residual volume (PVR).

In terms of urinary catheterisation time and hospital stay, all laser techniques and, specifically, the latest -HoLRP, HoLEp, KTP and TmLRP- were observed to have a clear advantage over TURP. Intervention time, in contrast, was longer for laser techniques, particularly HoLEP, HoLAP, HoLRP and KTP.

While no differences were showed in short- and long-term adverse results in general, a trend favouring the most recent laser techniques (HoLRP, HoLEP, KTP and TmLRP) over TURP was observed.

Conclusions and recommendations

- The scientific evidence is very heterogeneous as regards methodological quality and variables studied.
- The laser techniques assessed in this systematic review show an efficacy equivalent to that of TURP in the relief of prostatic symptoms, as measured by IPSS, Qmax and PVR.
- By reference to the outcomes of incontinence and urinary retention, retrograde ejaculation, erectile function, percentage of reintervention and mortality, the safety of the latest laser techniques is comparable to that of TURP. Although the decreases in haemoglobin concentration and need for blood transfusion were equivalent in both techniques, the result was nonetheless favourable to lasers.
- The most recent laser techniques outperform TURP in terms of the variables of hospital stay and urinary catheterisation time. TURP, in contrast, proved superior to laser techniques in terms of intervention time.
- A cost study should be undertaken targeting the latest laser techniques and the standard treatment, TURP, to ascertain the cost-effectiveness ratio.
- For the most recent laser techniques, such as TmLRP, HPS 120-W and HiDi, more good quality studies are required to confirm the data supported by the studies published to date.

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