Author Year; Country Score Research Design Total Sample Size	Methods	Outcome
Renganathan et al. 1997; India RCT Level 1 PEDro=4 N=28	**Population:** 28 men, Age: range 16-60 yrs. **Treatment:** Randomized to transdermal nitroglycerine or intracavernous injection of papaverine, two week washout, cross-over. **Outcome Measures:** Effectiveness of transdermal nitroglycerin vs. intracavernous injection of papaverine.	1. Erectile index for papaverine was significantly higher than that of nitroglycerine. 2. 93% who received papaverine had a complete response vs. 61% who received nitroglycerine. 3. 32% of patients had complications with papaverine vs 21% with nitorglycerine.
Yildiz et al. 2011; Turkey Prospective, one-way crossover, dose-controlled study Level 2 N=31	**Population:** Men with erectile dysfunction secondary to SCI**.** **Treatment:** Control: Received visual and auditory sexual stimulus (VASS). Treatment1- VASS with 25 mg of undiluted intracavernosal papaverine. Treatment 2 – Same participants as treatment 1, followed by 72 hour washout period **and** VASS with 50 mg of oral sildenafil on day 5. **Outcome Measures:** Peak systolic velocity (PSV), end diastolic velocity (EDV) for each cavernous artery.	1. There was a statistically higher PSV with papaverine (45.31(11.37)) or with sildenafil (41.59(15.55)) compared to control (22.25(7.54)). 2. There was no statistically significant difference between the PSV and EDV values of the papverine and sildenafil groups.
Soler et al. 2009; France Pre-post Level 4 N=14	**Population:** Men who sustained an abnormal prolonged erection or priapism following an intracavernous injection of prostaglandin E1 to induce erection. **Treatment:** Oral midodrine following the failure of 30 minutes of cooling procedures using ice or ether, or penile vibrator stimulation. **Outcome measures:** evaluation of penile rigidity at 30 minutes, and 1, 3 and 6 hrs post treatment.	1. All patients returned to flaccid penile state within 30-45 min after midodrine administration. 2. Oral midodrine was well tolerated with few side effects and without increasing incidence of AD. 3. Complete erection could be induced again 6 months later by intracavernous injection in all treated patients.
Moemen et al. 2008; Egypt Pre-Post Level 4 N=60	**Population:** 60 men with SCI and erectile dysfunction, at least 6 months post-injury, randomized into 3 groups of 20 (A, B, C). **Treatment:** Group A took sildenafil 50mg before sexual activity for 1 month; Group B were given intracorporal injection (ICI, 10 mg/ml prostaglandin E1 or 0.5 ml trimix) for 1 month and then took sildenafil for 1 month; Group C used vacuum constriction device (VCD) for 1 month and sildenafil for 1 month. **Outcome Measures:** International Index of Erectile Function – erectile function domain (IIEF-EF); Global Efficacy Assessment Questionnaire (GAQ); Hormonal Profile.	1. 90% of people in all groups showed improvement of erection as measured by IIEF-EF after sildenafil. 90% showed improvement in Group B after ICI, and 70% in Group C after VCD. 2. Improvement in erection reached 100% in all groups according to the GAQ, but ability to penetrate reached 90% after sildenafil, 90% after ICI, and 70% after VCD. 3. There was a significant increase in testosterone in all groups after sildenafil treatment. 4. Participants in Group B reported that ICI resulted in more rigid erections than sildenafil, but 14 participants preferred sildenafil due to easier administration; no participants in Group C was satisfied with VCD and preferred either ICI or sildenafil.

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Zaslau et al. 1999; USA Pre-post Level 4 N=37	**Population: 37 men, Age: mean 43.7 years, range 24-72 yrs, Level of injury: C3-L4.** **Treatment:** Intracavernosal injection (ICI) of papaverine & prostaglandin E1 (PGE1); Dosage was titrated until satisfactory erection obtained. **Outcome Measures:** Safety & efficacy of intracavernosal injection therapy, satisfaction.	1. 28 patients (76%) responded to injection. 2. 21% ejaculated during >50 % of sexual encounters. 3. At 3 months: 77% were moderately or extremely satisfied with therapy. 4. 85% rated their intracavernosal injection - produced erections as good or excellent. 5. 60% on intracavernosal injection reported almost always or always being able to have successful intercourse.
Tang et al. 1995; Republic of China Post-test Level 4 N=15	**Population:** Men with SCI; Age: mean 38.5 yrs, range 25-50; Injury level: cervical (n=1), thoracic (n=6), lumbar (n=8); Time since injury: mean 6.3 yrs. **Treatment:** Intracavernosal Prostaglandin E1 (IC PGE1) 5µg (up to 20µg) until full erection lasting 20 minutes. **Outcome measures:** Schramek grade of erection, blood pressure, heart rate.	1. All men achieved a rigid (grade 5) functional erection lasting at least 20 mins (mean 59.1 min), except 1 found to have venogenic impotence. 2. Grade of erection improved significantly post-treatment. 3. No significant dosage effect of PGE1 in the difference between pre- and post treatment. 4. No systemic side effects or other complications, however, 2 men complained of pain at injection site.
Hirsch et al. 1994; USA Pre-post Level 4 N=27	**Population:** 27 men (14 SCI, 7 multiple sclerosis, 6 discogenic disease); Age: (SCI) mean 31.5 yrs, range 22-39. **Treatment:** Intracavernosal Prostaglandin E1 (IC PGE1) 2.5µg initially, increased in 2.5µg increments, with a mean maintenance dose of 6.2 µg. **Outcome measures:** Continued home use or cessation of PGE1 at 28 months and reasons for cessation.	1. Rate of voluntary cessation in men with SCI at 28 months was 43%. 2. Main reason for voluntary cessation among men with SCI was urinary diversion, adrenal tumor, loss of interest, insurance difficulties. 3. Self-administered IC PGE1 was safe and efficacious, with all patients completing protocol reporting excellent rigidity and no discontinuations due to inadequate erectile response or pain.
Costa et al. 1993; France Pre-post Level 4 N=12	**Population:** Men with SCI; Age: mean 34 yrs, range 25-43; Injury level: C6-L1; Impairment: complete; Previous successful treatment with intracavernosal injection (ICI) of 20mg moxisylyte. **Treatment:** ICI of 20mg moxisylyte diluted in 0.4, 0.8, 1.2, and 2.0 ml solvent. **Outcome measure:** Rigidity of penis at 5-10-15-20-30 min after injection, abdomino-penile angle, penis length, and circumference of penis at same times, duration of erection, blood pressure (BP), heart rate (HR), adverse events.	1. Penile rigidity, abdomino-penile angle, length, circumference, and duration of erection were unaffected by dilution/change in volume of solvent. 2. Mean maximal values for rigidity ranged from 2.33-2.58/3 and lasted between 47-62.5 min. 3. No priapism or prolonged erections were noted.

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Kapoor et al. 1993; India Post-test Level 4 N=101	**Population:** 101 men with SCI; Age: range 20-51 yrs; Injury level: C4-L4, 65 paraplegia, 36 tetraplegia. **Treatment:** Intracavernosal injection (ICI) of papavarine hydrochloride. **Outcome Measures:** Erectile rigidity, duration of erection.	1. Satisfactory erection sufficient for penetration was possible in 98 patients. 2. 78 participants had good erection within 10 minutes, 13 within 20 minutes, 7 within 30 minutes. 3. Older patients required higher dose. 4. Erections lasted from < 1 hour to >4 hours.
Bodner et al. 1992; USA Post-test Level 4 N=58	**Population**: 58 men; Age: range 19-68 yrs; Injury level: cervical (n=19), thoracic (n=32), lumbar (n=17); Impairment grade: 44 complete, 14 incomplete, 19 cervical, 32 thoracic, 17 lumbar, (53%) dropped out. **Treatment**: 7.5mg papaverine, titrated to dosage that produced adequate erection, evaluated every week during titration period, then every 2 months. **Outcome Measures:** Erectile rigidity, complications.	1. Rigid erections in 45 patients (90%). 2. 53% of participants dropped out of program, usually after 1st injection or during titration period. 3. Main complication was prolonged erection necessitating aspiration and epinephrine injection.
Earle et al. 1992; Australia Post test Level 4 N=22 (14)	**Population:** Men with SCI; Age: mean 35.2 yrs, range 20-45; Injury level: cervical (n=3), thoracic (n=8), lumbosacral (n=3). **Treatment:** Intracavernosal self-injection (ICI) of papaverine 2-20mg or papaverine 40mg + phentolamine 0.5 mg or prostaglandin E1 1-20µg. **Outcome measures:** Achieve erection, patient acceptance (continued use of method), partner satisfaction and complications.	1. Full erection was achieved by 19 out of 22 men. 2. Out of 14 men who took part in survey, 12 reported continued use and satisfaction with self-injection (8 using papaverine, 1 using, papaverine + phentolamine and 3 using prostaglandin E1). 3. Partners of men with SCI responded positive in half of the cases. Two men stopped ICI due to partner disapproval. 4. Complications included blood in urethra, prolonged erection and bruising at injection site.
Sidi et al. 1987; USA Post-test Level 4 N=66	**Population:** 66 men with SCI, Age: range 18-61 yrs. **Treatment:** Intracavernosal injection of papaverine hydrochloride and phentolamine mesylate (n=22), papaverine hydrochloride alone (n=44). **Outcome Measures:** Erection quality.	1. 52 participants had functional erections. 2. In response to plain papaverine 20/30 responded with functional erections. 3. 4 participants had sustained erections that had to be drained. 4. 71% continued to use method.
Beretta et al. 1986; Italy Post-test Level 4 N=22	**Population:** 22 men, Age: range 18-52 yrs. **Treatment:** 20-30mg papaverine. **Outcome Measures:** Effectiveness of papaverine.	1. 20/22 participants were able to achieve an erection with complete rigidity with a mean duration of 4.1 hrs. 2. 20 participants who were successful at intercourse were offered training in self injection, but only 10 accepted. 3. 7/22 lasting >5 hrs controlled with ethilefrine and aspiration of corpus.