

요추간판 질환의 물리치료와 약물치료

Physical Therapy and Pharmacological Treatment of Lumbar Disc Herniations

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Abstract

In the industrialized world, low back pain is second only to headache as a cause of pain. It is the leading cause of expenditure for Workers' Compensation. Some 50~80% of adults will have low back pain at some time in their lives. Risk factors that influence the incidence or prevalence of low back pain are hard labor and heavy exertions, age, gender, anthropometric factors, postural factors, spine mobility, muscle strength, physical fitness, smoking, and psychosocial factors. Lumbar disk syndrome is a common cause of acute, chronic, or recurrent low back pain, particularly in young to middle - aged men. Most patients with discogenic low back pain respond well to conservative managements. Conservative treatments of back pain traditionally have included rest, avoidance of stressful activities, use of back supports, exercise, physical therapy, medication, traction, and nerve block. As in any acute injury, cold packs decrease edema for initial 48 hours, and then hot pack or radiant ramp for 20~35 min is used for control of acute back pain. Electrotherapy and deep heat can also be used. For acute discogenic disorders, the use of simple analgesics every 4 to 6 hours is also helpful. Adequate analgesia with acetaminophen, NSAIDs, or a short course of sedative muscle relaxants or even synthetic opiates may be recommended. Spinal orthosis is helpful to prevent a severe painful spasm of paraspinal muscles and to maintain a proper posture of the spinal column.

Keywords : Low back pain; Physical therapy;
Pharmacological treatment; Spinal orthosis

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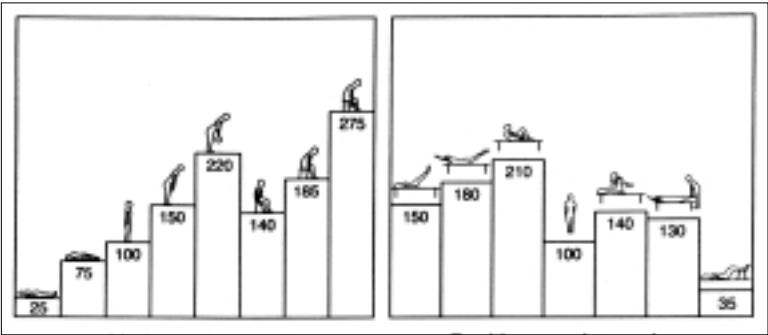
180

2%가

50~80%가

(1).

60%



1.)
)

3

(1).

가

(2).

2~3

2

(6).

가

(3).

, Saal Saal(4)

(7).

48

20~35

(5).

가

(NonSteroidal Anti - Inflammatory Drug,

NSAID),

4~6

NSAID

가 (9). COX - 2 Cyto-

NSAID kine, Growth factor, Endotoxin

(10), NSAID

NSAID

가

NSAID 가 NSAID

Miyamoto (11)

()

COX - 2 (induc-

가 (8). tion) PGE2 가, COX - 2

PGE2 phospholipase A,

cyclooxygenase(COX - 2), prostaglandin E2, tumor

necrosis factor, interleukin(IL) - 1, IL - 1,7 IL - 6,

IL - 8

IL - 6

1. (NonSteroidal Anti - Inflammatory Drug, NSAID)

1) opioid

NSAID . NSAID 1

가

En- "Discogenic pain" (12).

dorphin system , NSAID NSAID,

(Corticosteroid)

PG(prostaglandin) 가

bradykinin, histamine NSAID

가

cam 1 24 piroxi-

NSAID cyclooxygenase(COX) 6 (13).

PG

NSAID COX PG

COX 가 5

. COX - 1 PG NSAID

1.

(Chemical Class) Drug	Dose (mg/day)	Frequency (Times/Day)	Onset (hr)	Half - Life (hr)	Major Toxicity
(Salicylates)					
Aspirin	UP to 5200	4~6	1~2	4	G, R
(Substituted Salicylates)					
Diflunisal	500~1,500	2~3	1	11	G, R
Salsalate	3,000	2	2	4	G, R
(Propionic Acid Derivatives)					
Ibuprofen	1,200~3,600	4~6	1~2	1~3	G, R
Naproxen	500~1,500	2~3	3	13	G, R
Fenoprofen calcium	300~3,000	3~4	3	2~3	G, R
Ketoprofen	150~300	3~4	2	3~4	G, R
(Pyrrole Acetic Acid Derivatives)					
Sulindac	300~450	2~3	2	18	G
Indomethacin	75~225	1~3	2	1~4	G, R, CNS, BM
(Benzeneacetic Acid Derivative)					
Diclofenac sodium	75~225	2~3	2~3	2	G, R
Diclofenac potassium	100~150	2~3	1	2	G, R
(Oxicam)					
Piroxicam	20	1	5	38~45	G, R
Meloxicam	7.5~15	1	3	15~20	G, R
(Pyranocarboxylic acid)					
Etodolac	800~1,600	2~4	2	6	G, R
(Fenamate)					
Mefenamic acid	1,000	4	3	4	G, R
(Naphthylalkanone)					
Nabumetone	1,000~2,000	1~2	4	26	G, R
(COX - 2)					
Coxibs					
Celecoxib	200~800	1~2	3	11	R
Rofecoxib	12.5~50	1	1	18	R
Valdecoxib	10~40	1	1	11	R

BM : bone marrow, CNS : central nervous system, COX : cyclooxygenase, G : gastrointestinal, R : renal

aspirin 2,600 mg, NSAID PG , (17).
 ibuprofen 1,600 mg, naproxen 500 mg, etodolac 900 mg, diclofenac potassium 100 mg, celecoxib 400 mg, rofecoxib 25 mg, valdecoxib 20 mg (8).
 Sulindac NSAID 4~6 (17). (가
 , 가 NSAID(diflunisal, pi- 2.0 mg/dl) 가
 roxicam, naproxen sodium) COX - 2 65 ,
 12~24 . diflunisal ,
 12 2 . NSAIDs
 Piroxicam 가 6 , 가 COX - 2
 1
 . Naproxen sodium 8 .
 , rofecoxib 1 (1). COX - 2

2) NSAID COX - 2 가 . NSAIDs
 NSAID COX - 2 specific inhibitor 2 COX - 2
 , 가
 . warfarin .
 NSAID , 10% COX - 2
 (14). NSAID
 Nabumetone , NSAID , ,
 (15).
 , NSAID misoprostol 200 µg, 3~4
 65 , omeprazole(20~40 mg/d) famoti-
 , dine(40 mg bid) . Famotidine
 , omeprazole 20 mg/d
 , (8). COX - 2 40 mg/d (18).
 , , NSAID
 50% (16). 가
 NSAID 가 .

NSAID .

NSAID 가 . 가

가 가 , 1 .

NSAID 가

가

2) Tramadol

NSAID tramadol

opioid agonist norepi-

2. (Oral Corticosteroids) , nephrine serotonin

7

가 (19). Dexamethasone 가 , 40 ~ 60 mg 1 ~ 2

5 ~ 6 가

tors(COX - 2) NSAID

(20). (5 ~ 30 mg) . 6 100 mg

가, , (8).

(21) tra-

madol 가

(20.7% 51.3%), 가

3. (8) NSAID

(22).

가 . Paraphenol 가 Tramadol(37.5 mg) acetaminophen(325 mg)

codein/actaminophen(30 mg/300 mg)

4 500 ~ 650 mg , 1 (23).

4 g . Asprin

가

가

4.

2.

Drug	Route	Frequency	Half - Life	Duration
Morphine	Oral	q4h	2~3 hr	3~6 hr
Morphine CR	Oral	q12h	2~3 hr	8~12 hr
Morphine SR	Oral	q24h	2~3 hr	24 hr
	Oral	q24h	2~3 hr	24 hr
Oxycodone	Oral		2~3 hr	3~6 hr
	Oral	q12h	2~3 hr	8~12 hr
Fentanyl	Transdermal	q48~72h	13~22 hr	48~72 hr
	Transmucosal	q6h	7 hr	6~12 hr

NSAID

(25, 26).

GABA

가 , NSAID

(Gamma - aminobutyric acid)

(27).

cyclobenzaprine(Flexeril),

chlorphenesin(Maolate), orphenadrine citrate(Norflex), chlorzoxazone(Paraflex, parafone forte DSC), methocarbamol(Robaxin), Diazepam(Valium)

Codeine 60 mg
ibuprofen
oxycodone)
patch

4~6 ,
,
,

acetaminophen
(hydrocodone,
fentanyl

가

(2).

(Cyclobenzaprine

(Orphenadrine)

(24)

가

(28).

가

가

, 36

1

, 2

(8).

5.

가

6.

가

(glutamate)

가

가

(GABA)

(29).

가 ,

(가,

가,

가),

(Ia Ib

가, II ,

가),

(가), (

, counterirritant,

$$, \quad , \quad)$$

가 (30).

‘ , ‘ , ‘

(superficial heat)

가 , , , (deep heat)

(hot pack),

(paraffin bath), (fluido - therapy),

(radiant heat) , ,

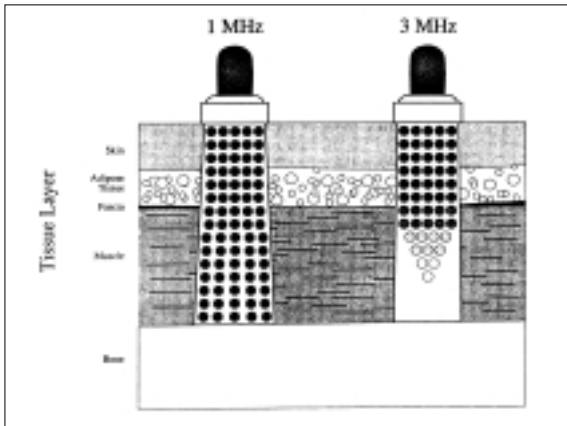
가 (, ,

(ultrasound), (short wave), (microwave)

(31). ,

가 , 가

가



2.

3.	가	
Intensity(W/cm ²)	1 MHz	3 MHz
Tissue depth	5 cm	1.2 cm
0.5	0.04' °C	0.3' °C
1.0	0.2' °C	0.6' °C
1.5	0.3' °C	0.9' °C
2.0	0.4' °C	1.4' °C

2)

20,000 Hz

0.8~1 MHz

(1)

(reverse piezoelectric effect)

가

1)

가

가

8

70~80

cm

4~5

20~30

가

46

가

(31).

(atten-

,가

uation)

30~60 cm

가

가

2 cm

1.3

가

, (whirl-

0.8 °C,

가

pool), Hubbard

가

(31).

1.5 w/cm²

4.		
U/S thermal effect	Temperature increased	Used for
Mild 0.1 to 1 watt per cm ² with a total output of 1 to 10 watts	1 °C	Mild inflammation Accelerating metabolic rate
Moderate 2 watts per cm ² with total output of 10 to 20 watts	2~3 °C	Decrease muscle spasm, pain Increase blood flow Reducing chronic inflammation
Vigorous up to 4 watts per cm ² with a total output of 40 watts	>3 °C	Tissue elongation Scar tissue reduction Inhibition of sympathetic activity

2.5 cm 4.9 °C 10

(2)

가 가

가

1 MHz 5 cm, 3 MHz 2 cm

(2).

20 , 3 , 2~3

가 가 3 MHz가

1 MHz 4 가 (

3)(30).

0.5 watt/cm²

1~2

(1.5 watt/cm²)

2~3

가

(4).

5.

General heat precautions

Near brain, eyes, reproductive organs

Gravid or menstruating uterus

Near pacemaker

Near spine, laminectomy sites

Malignancy

Skeletal immaturity

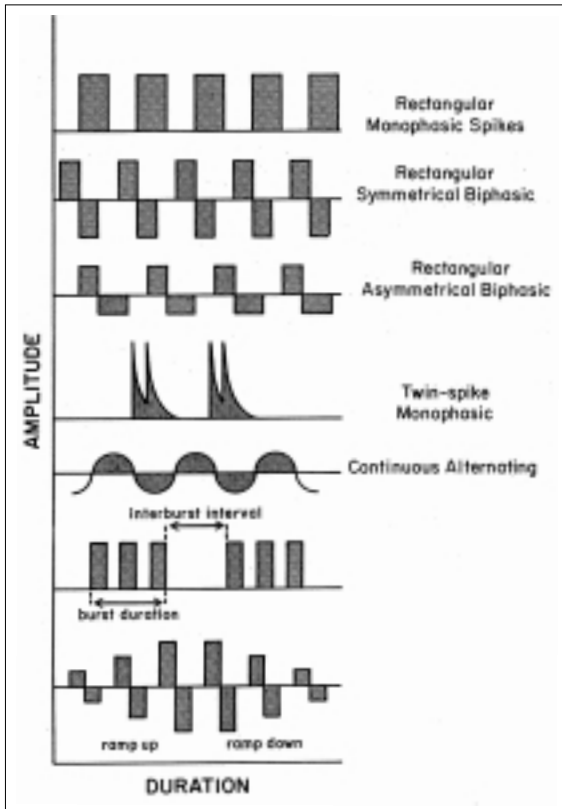
Arthroplasties, Methyl methacrylate

가

, 30

가

(5).



3.

(

),

(

stiffness 가)

가

(30).

가

2/3

33%

가

(32),

3. (Electrotherapy)

3).

가

, burst - modulated

alternating current

(asym-

metrical biphasic pulsed current)가

(gate control

theory)(33, 34),

가

1) (Transcutaneous Electrical Nerve Stimulation, TENS)

6.

Cardiac disability : stimulation of the thorax or neck, Pacemaker
Pregnancy : abdominal, lumbar, or pelvic region
Menstruation
Cancerous lesions
Site of infections
Exposed metal implants
Areas of particular nerve sensitive : carotid sinus, esophagus, larynx, pharynx, eye, upper thorax, temporal region
Skin irritation : from the gel, adhesive, or current flow
Severe obesity : adipose tissue † insulation against effective stimulation



4.

()

(4).

가

가

가

TENS

(amplitude), (pulse duration) .
2 ~ 200 Hz, 50 ~ 250 sec,
가 .
TENS (80 ~ 100 Hz) (100 sec
) .

,

.

,

(gate control mechanism)

,

,

,

endorphin enkephalins

(7)(35). TENS

7. TENS

Parameter	High TENS	Low TENS
Intensity	Sensory	Motor
Pulse frequency(Hz)	60~100	2~4
Pulse duration(sec)	60~100	150~250
Mode	Modulated rate	Modulated burst
Treatment duration	As need	30 min
Onset of relief	<10min	20~40 min
Duration of relief	Min to Hrs	Hrs
Mechanism	Gate control Theory <ul style="list-style-type: none"> - Selective stimulation of Large Dia N(A - delta) - Presynaptic inhibition of A - beta and C in substantial gelatinosa 	Norcoticlike pain reduction <ul style="list-style-type: none"> - Activation of small dia. Nociceptor and motor fiber - Release of beta endorphin - Delayed onset of effect, but longer duration
Indication	Acute soft tissue injury <ul style="list-style-type: none"> - Postop, pain, inflammatory pain, MF pain 	Chronic pain <ul style="list-style-type: none"> - Damage to deep tissue, MFPS, muscle spasm

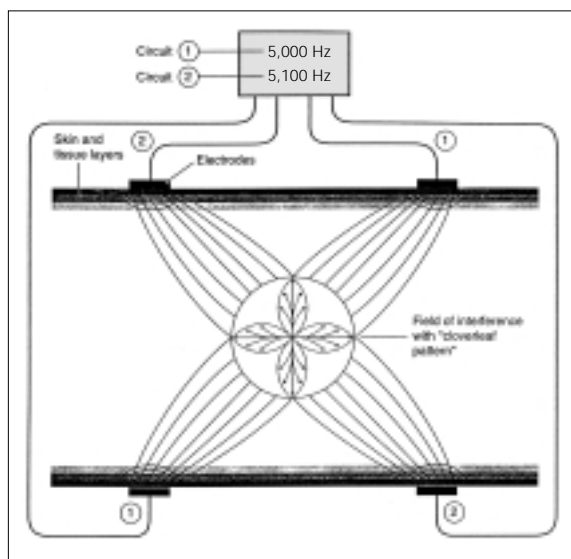
20 , 가 (40).
 , 가
 (36). 30
 가 (37).
 TENS . TENS 가
 가 ,
 (38, 39).

2)
 (High Voltage Galvanic Stimulation)

TENS , 150 V
 , ,
 . ,
 가 .
 ,

3)
 (Interferential Current Therapy, ICT)

TENS 가
 2
 , 4,000~5,000 Hz
 .
 (1,000~10,000 Hz) 1,000 Hz



5.

가
(5) 가

TENS

(41).

(Lumbosacral corset),

(42).

1/4 ~ 1/3

가

가

가

가

가

(42).

가

가

가

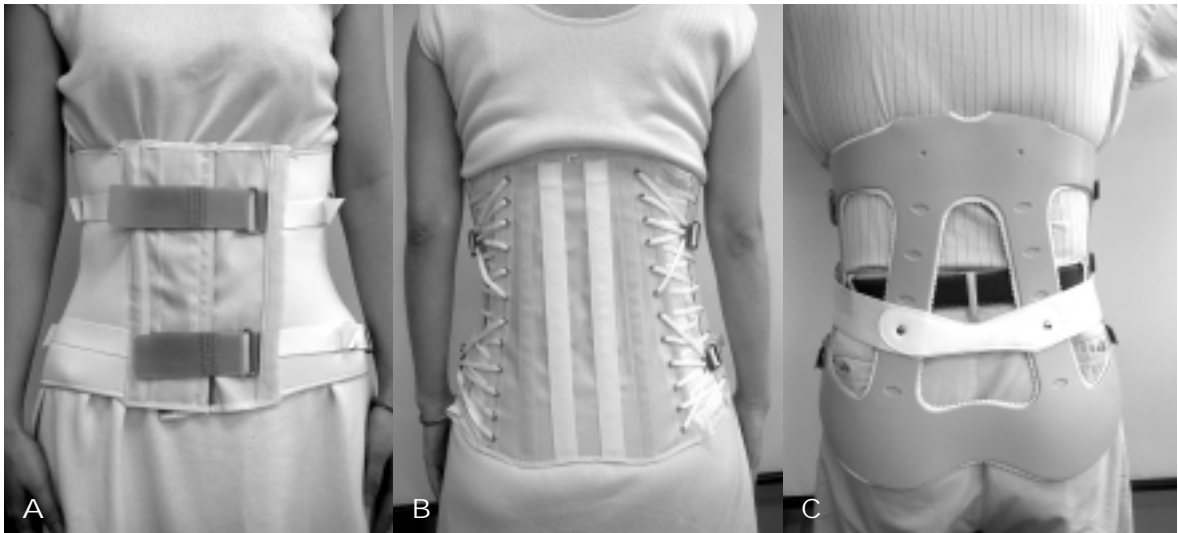
(discogenic pain),

가

8

가

(6A, 6B).



A, B)
C)

6.

(Lumbosacral orthosis, LSO)

(6C) , ,

가 .

, , .

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