

1.
(biomaterials)

(plate),

가

²
가



1982 ()
1984 ()
1992 ()
1994 Connecticut (Visiting
1995 Scientist)
1985



1992 ()
1994 ()
1999 ()
1999 Post - doc.



1971 ()
1973 ()
1978 Marburg ()
1981 Michigan Molecular In-
1983 stitute, Research Associate
1973
1996
1996
1997
1998

Polymeric Materials for Hard Tissue Fixation

(Jung Yul Lim, Soo Hyun Kim, and Young Ha Kim, Biomaterials Research Center, Korea Institute of Science and Technology, P. O. Box 131, Cheongryang, Seoul 130 - 650, Korea)

1.

	(GPa)	(MPa)
(longitudinal)	17.7	133
(transverse)	12.8	52
	0.4	7.4
	84.3	10
	11.0	39.3
	10.5	27.5
	159.1	10.4
	303.0	29.5
	401.5	46.5
	0.1 - 0.2	7.6
(longitudinal)	-	0.1
(transverse)	-	1.1

(hard tissue) (soft tissue)

가 (1).

가

(rod),

가 (intram-

edullary nail)

spine cage

total hip replacement, total knee replacement

가 bone cement (tissue engi-
neering) 가

(tissue engi-
neering) 가

2.2

가

가

30

(structural compatibility),

2.

2.1

(hydroxyapatite)
가³

(mucopolysaccharide) 가

가

70%

가

Wolff

가

가

가

가

(1).

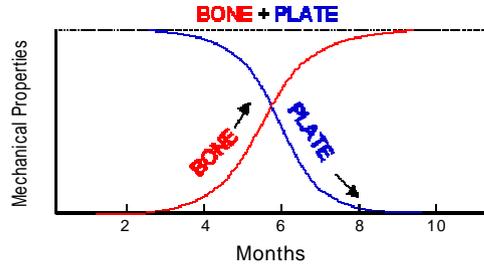
가

가

가

가

1
가
가



가

1.

가

가

가

가
가

'stress shielding'
가

'stress protec -
가

2

가

가

2

가

가

가

가

가

stress shielding

2

stress shielding

가

8-13

brittle

가

가

가

가

stress

가

14-17

가

가

stress shielding

shielding

가

가

가

가

3.2

3.2.1

가

가

가

가

1

(external fixation)

(internal fixation)

가

18

가

가

tapping

가

가

가
21,22

19,20

가

pull - out strength

가
23

3.2.2

(necrosis)

가

가

Co - Cr, Ti

가

2

가

(

가

)

가

2.38 mm

가

total hip joint re -

가

placement

가

가

가
shielding

stress

24 - 26

가

가

(cortical bone)

가

가

(cancellous

bone)

가

1

stress shielding

가

가 Ti

self - tapping

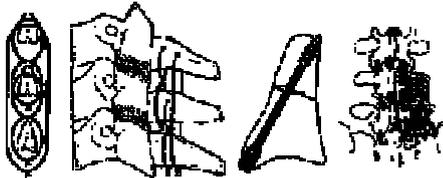
non - self -

mismatch

가

가
primary healing

가
가 (callus)



Wire

Screw

Plate

2.

).

가

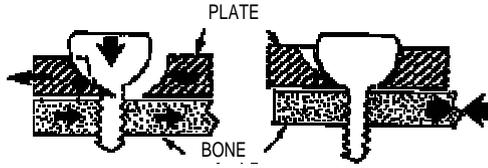
micromotion

가

27

가

(LCP, low



3. Dynamic compression plate (DCP)

5. Failure Mode

Failure mode	Failure	
	/	

contact plate)

²⁸

compression plate(DCP)가 (dynamic 3). DCP

가

가

(intramedullary nail) /

/
가

/

가

/

(fatigue failure)

/

3.3

3.3.1

가

Ti

, Co - Cr, NiTi,

3

wear

stress shielding

가

2

(HA)

가

brittle

가

가

가

3.3.2

stress shielding

가

(PTFE),

가

가

가

(non - resorbable),

(partially - resorbable),

(fully - resorbable)

CF(carbon fiber)/

^{29,30}

6.

	SmartScrew Sysorb Endofix Arthrex Bioscrew Phusiline Biologically Quiet	LPLA DLPLA PGA - TMC LPLA LPLA LPLA - DLPLA PGA - DLPLA	Bionx Synos Acufex Arthrex Linvatec Phusis Instrument Maker
anchor	Bio - Statak Suretac	LPLA PGA - TMC	Zimmer Acufex
Anastomosis clip	Lactosorb	LPLA	Davis and Geck
Anastomosis ring	Valtrac	PGA	Davis and Geck
	Biofix Resor - Pin	LPLA PGA LPLA - DLPLA	Bionx Geistlich
	SamrtTack	LPLA	Bionx
	LactoSorb Antrisorb	PGA - LPLA DLPLA	Lorenz Atrix

PLA: Poly (L - lactide), DLPLA: poly (D,L - lactide).
PGA - TMC: Poly (glycolide - co - trimethylene carbonate).

가 ³¹ 가
가 CF/PMMA, ³² CF/PP, ³³
CF/PS, ³⁴ CF/PE, ³⁵ CF/PBT, ³⁶ CF/PEEK ^{37,38}
가 가

가
stress mismatch 가 stress shielding 가
가
가

2
(PLA)
(PGA)가
가
self - reinforcing
14,39 15 - 17 6

가
CF/PLA 가
가

40
4.

stress shielding
가 가
2
가 가
가
가
가
가 가
stress shielding

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