

Base metal Alloy에 관한 考察

東南保健專門大學 齒技工科

成 桓 慶

ABSTRACT

Study on Base Metal Alloy

Hwan Kyung Sung

Department of Dental Technology, Dong Nam Health Junior College

This paper aims to examine base metal alloy in all its aspects - the roles of elements, the content of every element according to uses, characters, laboratory technique methods and the kind of artificial base metal alloy registered in A.D.A. Specification.

The results are as follows;

1. Base metal alloy is used widely because it is rather cheap, but it should be handled appropriately in operating because its quality is bad.
2. Classifying base metal alloy, it is classified into Co-Cr alloy, Ni-Cr alloy, and Ni-Cr-Co alloy according to element, it is classified into partial denture alloy, surgical alloy and crown & bridge alloy according to use.
3. Among elements of base metal alloy, Bismuth lowers the melting point of the alloy and increases the strength, but the amount should be limited when it is used because it destroys the organization of a living body.
4. The investments for base metal alloy are ethyl silicate bonded investment and phosphate bonded investment which endure well at high burn out temperature.
5. A.D.A specification No.14 in Korea contains Niobium, Niobium, Invar, Ticonium and Vitallium.

I. 서론

가 특성
 Pure metal(純金屬) alloy(合金
 屬), 가 與否 Wrought metal(가
) Cast metal(), 含
 有 程道 noble metal() base
 metal() noble
 metal Gold alloy 齒科 回復
 物 機械的, 作美的 特性
 가

base metal alloy
 實情 . base metal alloy

가 가

base metal alloy

適用 가

II. 考察

1. Base metal alloy 의 分類

Base metal alloy 1
 Co-Cr alloy, Ni-Cr alloy,
 Ni-Cr-co alloy 區分 ,
 partial denture alloy, surgical alloy,
 Crown and bridge alloy .
 partial denture
 alloy 可撤式 局部義齒, 總義齒, 齒周副木
 , surgical() alloy

wire bar, Implant(埋植物)
 , Crown and bridge alloy metal
 bonded porcelain crown and bridge 通常的
 crown and bridge .(表 1).

2. Base metal alloy 의 各 成分에 따른 役割

Base metal alloy
 2 Cr , 腐蝕
 抵抗性, 가 , Co ,
 가 Ni 가 ,
 . Ni 反應
 , 延性, 展性
 强度, 硬度 . C(Carbon) Co-
 Cr(cobalt-chrome)
 炭化物
 flame()
 炭素가 吸收 增加
 50%
 Mo(Molybdenum)

1. Base metal alloy 分類

<ul style="list-style-type: none"> Partial denture alloy Removable partial denture frame work Full denture base Periodontal splint 	<ul style="list-style-type: none"> Co-Cr alloy Ni-Cr alloy Co-Cr-Ni alloy 	
		<ul style="list-style-type: none"> Surgical alloy Orthopedic surgery() bar and wire Implant
		<ul style="list-style-type: none"> Crown & Bridge alloy Metal-bonded porcelain crown bridge Conventional Crown & bridge

表 2. 各 成分 役割

Cr(chromium) _____	
Co(cobalt) _____	가, 가
Ni(Nickel) _____	, 가, ,
C(carbon) _____	Co Cr
Mo(Molybdenum) _____	, 가
Be(Beryllium) _____	, 가,
Mn(Manganese) _____	
Al(aluminum) _____	
W(Tungsten) _____	가

가 , Be(Bellium) 熔融點
가

清淨材 役割 Mn() Al()
鑄造性 , W() 酸化膜 硬度
Si() base metal alloy
延性 展性 가

3. Base Metal alloy의 用途에 따른 各成分의 含有量, 特性 및 造作法

(1) Partial Denture用 base metal alloy

Partial denture用 base metal alloy Co-Cr alloy Ni-Cr alloy 가 가 Co-Cr alloy Co:60%, Cr: 25~30%, Mn, Si, Mo, C, W Carbon 強度 低下 招來 0.25% . Ni-Cr alloy Ni:70%, Cr:16%, Al:2%, Be:0.5%, Mo, W, Mn, Co, C, Si .(表 3).

表 3. Partial denture base metal alloy 助成

1. Co-Cr alloy Co : 60% Cr : 25~30% Mn, Si, Mo, W C 0.25%
2. Ni-Cr alloy Ni : 70% Cr : 16% Al : 2% Be : 0.5% Mo, W, Mn, Co, C, Si

(2) Partial Denture用 base metal alloy 特性

Partial denture用 base metal alloy
表 4 가 1,399 ~ 1,454
8~9 , 鑄造收縮 2.05~2.33%, Brinell hardness number 370, 가 90,000~120,000 PSI, 彈力性 30x606 PSI, 2~10% . Co-Cr alloy 熱處理 影響 Ni-Cr alloy 熱處理 影響 軟化熱處理 1,800

15 繫留 ,
1,300 15 繫留
Toughness(強度)가 增加 .(表 4).

表 4. Partial denture用 base metal alloy 特性

1. : 1,399 (2,550) ~ 1,454 (2,650)
2. Color : White
3. : 8~9 g/cm ³
4. : 2.05~2.33 %
5. (B.H.N) : 370
6. Tensile strength : 90,000~120,000 pound/square inch
7. : 300,000 pound/square inch
8. Elongation : 2~10 %
9. Heat treatment() Co-Cr alloy : Ni-Cr alloy
quench : 1,800 15
quench : 1,300 15

(3) Partial Denture用 base metal alloy 造作

base metal alloy 表 5
埋沒材 燒還溫度 ethyl silicate bonded investment phosphate nonded investmnet , 燒還 1,350 ~1,800 1,800 가 가 gas가 鑄造 矢販가 . 熔融 gas 電氣熔融機() ring bench cooling 가

表 5. Partial denture base metal alloy

1. : ethyl silicate bonded investment phosphate bonded investment
2. : 1,350~1,800 가 , 1,800
3. Melting : - gas,
4. : Casting bench cooling , Mold Sand blasting
5. Polishing : High speed spindle

mold
 酸化膜
 blasing
 engine
 polishing
(4) Partial Denture用 base metal alloy 既成製品
 表 6
 alloy 種類

Sand
 high speed
 .(表 5)
 base metal
 metal

A.D.A(美國齒科醫師協會) 規程 No.14 合格
 , Type 1,316 (2,400)
 high fusing用 alloy
 Type 1316 (2,400)
 Low fusing alloy Ticonium
 Premium 100 Ni-Cr alloy
 Co-Cr alloy
 Niranium, Nobilium, Regalloy, Ticonium,
 Vitallium .(表 6)

表 6. Partial denture用 base metal alloy 種類(A.D.A spe No.14)

Type . High fusing	Manufacturer
Alloy X-12	Federal Prosthetics, Inc.
Dentorium	Dentorium Products Co, Inc
Derallium LG alloy	LG DiV, J.F.Jelenko Co.
Niranium	Niraniym Co.
Platinore	Allen Dynamics, Inc.
Nobilium Alloy	Nobilium Products, Inc.
Regalloy	Ransom & Randolph Co.
Stalite chromium-Cobalt Alloy " S " Ingots	Stalite Inc.
Ticonium premium 100	Ticonium Co.
Vatallium	Howmedica Inc. Dental Div
Type , Low fusing	Manufacturer
Ticonium No.50	Ticonium Co.

4. Surgical用 base metal alloy의 組成 特性 種類

(1) Surgical用 base metal alloy

Surgical用 base metal alloy Co-Cr alloy Ni-Cr-Co alloy가
 Partial denture用 alloy Ni-Cr-Co alloy가 Ni : 54%, Cr : 25%, Co : 15%
 (表 7).

(2) Surgical用 metal alloy 特性

Surgical 用 base metal alloy

表 7. Surgical用 base metal alloy 組成

1. Co-Cr alloy Co: 60%, Cr: 32% Mo, Si, Fe, Mn, C
2. Ni-Cr-Co alloy Ni: 54%, Cr: 25%, Co: 15% Mn, Si, Fe, Mn, C

Partial denture用 alloy 가 100
 , Rockwell hardness munber
 19 ~ 54 partial denture alloy
 가 .(表 8)

表 8. Surgical用 base metal alloy 特性

1. : 1,554 (2,650)
2. Color : White
3. : 8 g/cm ³
4. Tensile strength : 68,000 ~ 130,000 pound/square inch
5. : 29 ~ 36 × 10 ⁶ pound/square inch
6. Elongation : 2 ~ 20%
7. (R-30N) : 19 ~ 54

(3) Surgical용 base metal alloy 既成製品

C0-Cr alloy Vitallium Ni-Cr-Co alloy Surgical Ticonium
 差異點 Vitallium 가 Surgical Ticonium 延性 展性 가
 .(表 9)

表 9. Surgical용 base metal alloy 種類 (A.D.A., spe, No.14)

- 1. Vitallium : Cr-Co alloy
- 2. Surgical Ticonium : Ni-Cr-Co alloy

5. Crown and Bridge용 base metal alloy 의 성분, 특성, 조작, 종류

(1) Crown and Bridge용 base metal alloy

alloy Ni-Cr alloy Fe-Cr alloy
 Partial denture용 base metal alloy
 Be Fe-Cr alloy

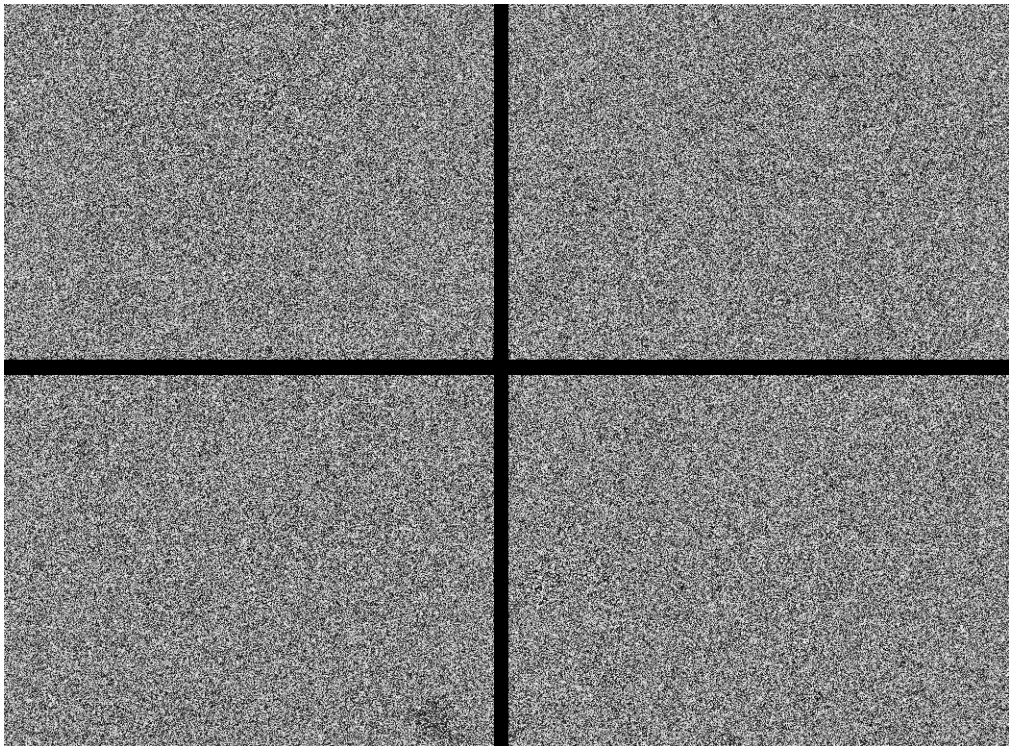
Fe:55%, Cr:27%
 .(表 10)

表 10. Crown and Bridge용 base metal alloy

- 1. Ni-Cr alloy
 Ni : 67 ~ 80 %, Cr : 12 ~ 20 %
 Al, Mo, C, Mn, Si, Be(0.5 ~ 2%)
- 2. Fe-Cr alloy
 Fe : 55 %, Cr : 27%
 Al, Mo, C, Mn, Si, Be

(2) Crown and Bridge용 base metal alloy 構造 特性

11 Crown and Bridge용 base metal alloy 顯微鏡的
 . A(Ticon) B(Gemini) alloy Be 包含
 가
 . C(Wiron-S)
 D(Wicrobond-N.P.) Be
 .(11)



11. CCrown and Bridge용 base metal alloy
 A. Ticon B. Gemini C. Wiron-S D. Microbond-Np

Crown and Bridge用 base metal alloy
 Ni-Cr alloy 가 1,232 ~ 1,343
 , Fe-Cr alloy 1,454 ,
 15 ~ 30% Partial denture用
 base metal alloy .(表 12)

(3) Crown and Bridge用 base metal alloy 既成製品

partial denture用 alloy
 , 1,500
 ~ 1,700 .(表 13)

Crown and Bridge用 base metal alloy
 表14 . Gemini ,
 Microbond 2,000, Nobil Ceram, Permabond,
 Ticon, Ultrat Be ,
 Howmedica Type gold alloy(Crown
 and Bridge用 gold alloy) 가

表 12. Crown and Bridge用 base metal alloy

- | | |
|----|---|
| 1. | : No-Cr alloy : 1,232 (2,250) ~ 1,343 (2,450) |
| 2. | Color : White |
| 3. | : 8g/cm ³ |
| 4. | (R-30N) : 30 ~ 50 |
| 5. | Tensile strength : 80,000 ~ 150,000 pound/Square inch |
| 6. | : 30 × 10 ⁶ pound/Square inch |
| 7. | Elongation : 15 ~ 30% |

表 13. Crown and Bridge用 base metal alloy

- | | |
|----|--------------------------------|
| 1. | : Phosphate bonded investment |
| 2. | : 816 (1,500) ~ 927 (1,700) |
| 3. | : - gas
- gas |
| 4. | polishing : High speed spindle |

表 14. Crown and Bridge用 base metal alloy (A.D.A., spe, No.14)

Alloy	Manufacturer
Aura Tec	Aura Tec industries, Inc.
Dentillium CB	Codesco, Inc.
Gemini +	Kerr Mfg, Co.
Howmdica 111+	Howmedica, Inc
Microbond 2,000 +	Howmedica, Inc
Microbond NP	Howmedica, Inc
Nobil ceram +	Nobilium Products, Inc
Omega VK	Omega Dental Products, Inc
Perma-Bond +	Perma-Bond Co.
Qualimet A	Qualimet Research Co.
Ticon +	Ticonium Co.
Ultatek +	Ultatek Metals For modern Dentist

III. 結 論

Base metal alloy
 ,
 A.D.A 規格 , 登録 既成
 Base metal alloy

1. Base metal alloy 經濟的 負擔 가 가

2. Base metal alloy 分類
 Co-Cr alloy, No-Cr alloy, Ni-Cr-Co alloy 區分 , Partial denture用 alloy, Surgical用 alloy, Crown and Bridge用 alloy 區分 .
 3. Base metal alloy (Be) 가

