

관교의치 및 금속 도재 보철물용 Ni-Cr 합금과 Ag-Pd 합금의 재사용에 따른 주조 재현성의 변화

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Abstract

Castability of Some Repeatedly Used Ni-Cr Alloys and Ag-Pd Alloys for Crown and Bridge and Metal-Ceramic Restorations

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The purpose of this study is to evaluate the effects of melting and casting procedures on the castability of some Ni-Cr and Ag-Pd alloys. One Ag-Pd alloy and two Ni-Cr alloys were chosen for study, and the first casting group of these alloys were used as the control, and with which the castability of the first recase group and the mixture group of the first recast and as much amount of the first casting alloy was compared.

The results of this study were as follows:

1. The castability of the first recast alloys varied significantly depending upon the presence or absence of the first casting alloy and the kind of alloys.
2. When the first recast alloy was mixed with as much amount of the first casting alloy, there was no significant difference in castability between the first recast group and the first casting group.
3. When the first recast alloy was used alone, the castability varied significantly depending upon the kind of alloys, i.e., the castability of Rexillum and Palliag M was decreased significantly when compared with that of the first casting groups, while that of C & B Alloy was not.

1. 서론

1-5)

가

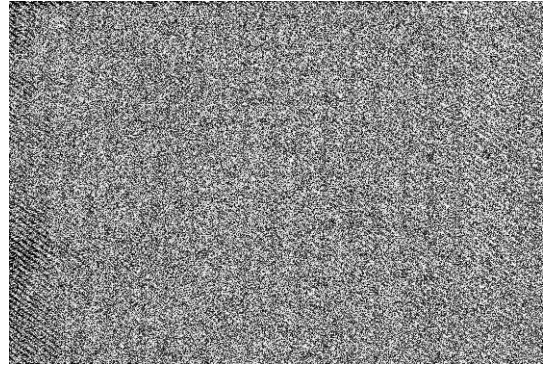
Ag-Pd
Ni-Cr
Ni-Cr
가
,
,
,
37

Ni-Cr
가
Ag-Pd
type
type

6-11)

12,13) Pd Ag mold stone
 가
 14,15) Ni-Cr Ag-Pd undercut wax blockout
 가 die stone
 Ag-Pd stone
 mold
 mold
 Ag, Pd가
 Ni-Cr red utility wax (가)
 Cr 가 45

50%
 12-18)
 Ag-Pd Ni-Cr
 가



1.

II. 실험재료 및 방법

1. 실험재료

Ni-Cr Rexillium
 (Jeneric Gold Co., U.S.A.) C & B Alloy
 (Panatec Corp., Japan), Ag-Pd
 Palliag (Degussa Co., Federal Republic of Germany)
 Rexillium
 , C & B Alloy Palliag

2) 가
 14 gauge (1.63mm) wax 2
 (22 x 22mm) wax
 12 gauge (2.05mm) wax
 1 V
 wax ring
 6mm 가 ()
 2). 380mm, 500mm
 ring 0.75mm

2. 실험방법

1)

(網狀)
 stone mold wax Alloy, Rexillium Palliag M, C & B
 가 3가
 5
 Rexillium 5.03 ± 0.45mg, C & B Alloy 5.21
 ± 0.05mg, Palliag M 5.01 ± 0.35mg
 370µm tape Rexillium C
 cyanoacrylate & B Alloy - Gas
 stone mold , Palliag M Gas

Pallig M
flux
(Kerr Corp., U.S.A.)

sandblasting

가

casting segment()

wax

oxide sandblasting 50μm aluminum (3)

가

new

III. 실험결과

alloy() sandblasting

old alloy() mixed alloy()

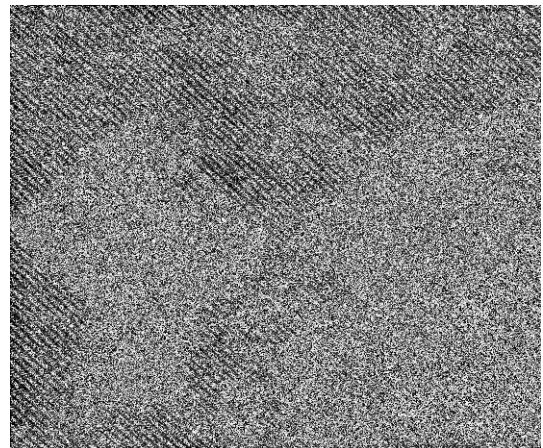
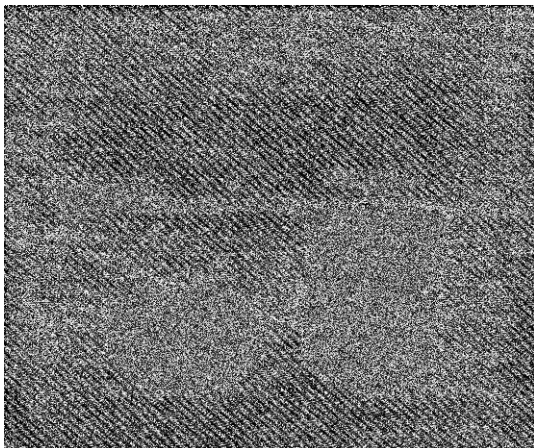
2

262.08 ~ 392.00

Rexillium

1.

합 금	매 물 재	매 물 재 의 제조업자	매 물 재 의 혼 수 비	매 물 재 의 종 류	매 물 재 의 소 회 온 도	합 금 의 용 용 온 도
Pallig®M	Whip-Mix Cristobalite inlay investment	Whip-Mix Corporation, U.S.A.	0.40	Gypsumbonded	700 °C	950~1040 °C
C & B Alloy	High-Temp 2	Whip-Mix Corporation U.S.A.	0.14	Phosphatebonded	800 °C	1150 °C
Rexillium III	High-Temp 2	Whip-Mix Corporation U.S.A.	0.14	Phosphatebonded	982 °C	2250~2350 °C



2. Wax ring

6mm

3. 가

가
 388.80 가 ,
 372.80 가 . C & B Alloy 2
 388.00 가
 387.40 (P<0.01).
 가
 가 . Palliag M
 392.00 가
 가 ,
 262.80 가 ,
 가 Rexillium
 가 ,
 Palliag M (P<0.05), C & B Alloy
 가 392.00 가 . C
 & B Alloy 가 387.80 가 (P>0.05), Palliag M
 가 389.80 가 Rexillium 가 382.80 (P<0.01)
 가
 C & B Alloy가 388.80 가
 Palliag M 가 (P<0.01).

2.

(:)

<합금의 재사용 여부>

상 품 명	조 사 수	항 목	새 합금 (New alloy)	혼합 합금 (50 % new alloy + 50 % old alloy)	현 합금 (old alloy)
Rexillium III	5	산술평균	$X_1 = 388.80$	$X_2 = 382.80$	$X_3 = 372.80$
		표준편차	2.28	12.91	19.52
C & B Alloy	5	산술평균	$X_4 = 387.80$	$X_5 = 387.40$	$X_6 = 388.00$
		표준편차	3.70	2.51	2.74
Palliag® M	5	산술평균	$X_7 = 392.00$	$X_8 = 389.80$	$X_9 = 262.80$
		표준편차	0.00	1.92	22.08

<분산 분석표>

	평 방 합	자 유 도	불 편 분 산	F	
합 금 간	-351255.867	2	-175627.934	1474.49	$P < 0.01$
실 험 간	22057.733	2	11028.867	92.59	$P < 0.01$
합금과 실험의 상호작용	398107.334	4	99526.834	853.58	$P < 0.01$
오 차	4288.000	36	119.111		
합 계	73197.200	44			

3.

t

항 목 간	자유도	t 값	Prob.
X ₁ ~ X ₂	8	0.869	P > 0.05
X ₁ ~ X ₃	8	2.318	P < 0.05
X ₂ ~ X ₃	8	1.449	P > 0.05
X ₄ ~ X ₅	8	0.058	P > 0.05
X ₄ ~ X ₆	8	- 0.029	P > 0.05
X ₅ ~ X ₆	8	- 0.087	P > 0.05
X ₇ ~ X ₈	8	0.319	P > 0.05
X ₇ ~ X ₉	8	18.718	P < 0.01
X ₈ ~ X ₉	8	18.399	P < 0.01
X ₁ ~ X ₄	8	0.145	P > 0.05
X ₁ ~ X ₇	8	- 0.464	P > 0.05
X ₄ ~ X ₇	8	- 0.608	P > 0.05
X ₂ ~ X ₅	8	- 0.666	P > 0.05
X ₂ ~ X ₈	8	- 1.014	P > 0.05
X ₅ ~ X ₈	8	- 0.348	P > 0.05
X ₃ ~ X ₆	8	- 2.202	P < 0.05
X ₃ ~ X ₉	8	15.936	P < 0.01
X ₆ ~ X ₉	8	18.138	P < 0.01

가

가

wax

가

Anderson¹⁷⁾

가

Cr

Zn

가

Ag-Pd

Pallia g M

가

Kaminski

¹⁹⁾

Salivan H

Ney 76

Duncan²⁰⁾

Pallia g M

가 950 ~ 1,040

Ni-Cr

C & B Alloy(

: 1,150)

Rexillium (

: 1,232 ~ 1,287)

. Pallia g M

(P>0.05),

가 (P>0.05),

가

가

(P<0.05).

, Pallia g M

700

C & B

Alloy

(800)

Rexillium

(982)

IV. 총괄 및 고안

가

²¹⁾

sprue

button

가

Rexillium

가

가 , C & B Alloy

¹⁶⁾ Ni-Cr

Ag-Pd

가

가

¹⁷⁾

Pallia g M

Ni-Cr

Ag-Pd

Ni-Cr

Ag-Pd

가

C & B Alloy

Kaminski¹⁹⁾
base alloy
Zn

Anderson¹⁵⁾, Phillips¹⁶⁾,
silver-

가 Ag, Pd Cu가

Ni-Cr Ag-Pd

가

가

가

가

V. 결론

45

Ni-Cr

Ag-Pd

Rexillum, C & B

Alloy,

Pallag M

1. Ni-Cr

Ag-Pd

2.

3.

Rexillum

Pallag M

참고 문헌

1. Moffa, J.P.: Physical and mechanical properties of gold and base metal alloys; Proceedings Alternatives to gold alloys in dentistry, DHEW publication, No. (NIH) 77-1277: 81-93, 1977.
2. Hinman, R.W., J.A. Tesk, R.P. Whitlock, E.E. Parry, and J.S. Durkowski: Use of a castability test for optimizing mold and casting temperature, Int. Dent. Res., Abstr. No. 374, 1981.
3. Phillips, R.W.: Skinner's science of dental materials, ed. 8, W.B. Saunder's Co., Philadelphia, 547, 1982.
4. Gettleman, L., J.P. Moffa, A.A. Lugassy, and A.D. Guckes: An evaluation of non-precious alloys for use with porcelain veneers; Part I, Physical properties, J. Prosth. Dent. 30:424-431, 1973.
5. Sced, I.R. and J.W. McLean: The strength of metal ceramic bonds with base metal containing Chromium, Br. Dent. J., 132-232-234, 1972.
6. Huget, E.F., et al: Base metal crown and bridge alloys; Proceedings, IADR annual meeting, London, 1978.
7. Asgar, K.: Melting and casting of alloys; Proceedings, Alternatives to gold alloys in dentistry, DHEW Publication, No. (NIH) 77-1227: 166, 1977.
8. Vincent, P.E., L. Stevens, and K.E. Basford: A comparison of the casting ability of precious and nonprecious alloys for porcelain veneering, J. Prosth. Dent. 37:25, 1977.
9. Nitkin, D.A., and K. Asgar: Evaluation of alternative alloys to type III gold for use in fixed prosthodontics, J. Am. Dent. Assoc., 93:622, 1976.
10. Huget, E.F. and S. Civijan: Status report on palladium-silver based crown and bridge

- alloys, J. Am. Dent. Assoc., 89:383, 1974.
11. Duncanson, M.G.: Nonprecious metal alloys of fixed restorative dentistry, Dent. Clin. North Am., 20: 423, 1976.
 12. Phillips, R.W.: Skinner's science of dental materials, ed. 8., W.B. Saunder's Co., Philadelphia, 376, 1982.
 13. O'Brien, W.J. and G. Ryge: An outline of dental materials and their selection, W.B. Saunder's Co., Philadelphia, 243, 1978.
 14. McLean, J.W.: The science and art of dental ceramics, Vol. 1, Quintessence Publishing Co., Chicago, 91, 1979.
 15. Anderson, J.N.: Applied dental materials, ed. 5, Blackwell scientific publications, Oxford, England, 87, 1976.
 16. Phillips, R.W.: Skinner's science of dental materials, ed. 8, W.B. Saunder's Co., Philadelphia, 380, 1982.
 17. Anderson, J.N.: Applied dental materials, ed. 5., Blackwell scientific publications, Oxford, England, 94, 1976.
 18. 윤창근 : Laboratory manual of crown and bridge, 대학서림, 154, 1984.
 19. Kaminski, R.A., K.J. Anusavice, T. Okabe, P.K. Morse, and P.E. Casteel: Castability of silverbase fixed partial denture alloys, J. Prosth. Dent., 53:329, 1985.
 20. Duncan J.D.: Casting accuracy of nickel-chromium alloys; Marginal discrepancies, J. Dent. Res., 59:1164, 1980.
 21. Johnston J.F., G. Mumford, and R.W. Dykema: Modern practice in dental ceramics W.B. Saunders Co., Philadelphia, 188, 1970.