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Research Article

All-Ceramic Restorations of Disilicate Lithium, Alumina and Zirconia Part B: Clinical Data

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Abstract

All-ceramic restorations are a growing trend in dentistry as they offer better aesthetics and biocompatibility than metal-ceramic. Occasionally different ceramic systems have appeared. The purpose of this review was to explore the FDP's survival rates on natural teeth, which are manufactured by Alumina, Lithium Disilicate and Zirconia ceramics, possible complications (technical/biological) and the frequency of occurrence.

The survival rates of Lithium Disilicateceramics were 86.1-98.2% over 10 years for single crowns, while for bridges survival rates ranged from 51-87.9% over 10 years. For Alumina ceramics the survival rates were 90.2-99.1% for single crowns in 3-6 years and 86.2% for bridges in 5 years. Finally, Zirconia ceramics showed survival rates of 79-91.2% for single crowns and 70.5-100% for bridges in 5 years. From the complications studied, it turned out that caries are the most common biological complication, while chipping is the most frequent technical complication. In summary, all-ceramic systems can be an alternative to metal-ceramic restorations, especially in areas with aesthetic demands.

Keywords: Disilicate Lithium; Alumina; Zirconia; Survival Rates; Complications

Prologue

The Still Restorations (APD) may be constructed from various materials. For many years the construction of metal ceramic restorations was the "gold standard". However, for several decades, mainly because of the increased aesthetic requirements, ceramic GVA are a promising alternative. Previously developed many kinds of ceramic systems to combine the necessary strength required for intraoral function with increased aesthetic properties of ceramic. For many researchers there are no statistically significant differences in survival between ceramic and metal-APA [1-5]. Indicatively, ceramic and metal-ceramic survival APD for 5 years reading times, 88-100% [6] and 94.4% '[5] respectively. Breaking the appearance of pottery is the most common epiploki [7,8]. One of the most famous ceramic systems are those used for the manufacture of the ceramic core (backbone) Alumina, Zirconia and lithium disilicate. The purpose of this study was the investigation of the APD survival rates in natural teeth, which are made from the above materials, as well as the potential complications of all-ceramic restorations (technical and biological), but the frequency of such occurrence.

Material and Method

In this work were reviewed the English-language literature from 2000 to 2017. The inclusion criteria were: 1) clinical studies and literature reviews, 2) supported dental ceramic restorations, made of alumina, lithium disilicate or zirconium, 3) singleton hoops or stationary bridges in anterior or posterior teeth, 4) minimum control time of 3 years. Exclusion criteria were: 1) implant supported ceramic restorations, 2) partial coating crowns, inlays/onlays, aspects and imiakinites bridges, 3) absence retest. The sample consisted of four clinical studies involving all-ceramic restorations with lithium disilicate skeleton, five involving restorations frame Alumina, eight related restorations backbone zirconia and ceramic coating and four literature reviews including benchmarking ceramic restorations zirconia, lithium disilicate and aluminum together, but also to conventional metal-. All inquiries regarding GVA, with follow-up of at least three years, with most reported in five-year survival.

Results

The results for the survival and complications of GVA for all three types of ceramic are detailed in Table 1 and 2.

Authors	Watch time	Skeleton	Number of restorations (N)	Recovery Type	Region	Pedestal type	Powder adhesion	Survival (%)
Vult Von Steyern P., *et al.* (2001)	5 years	Alumina (In ceram alumina)	20	SAA 3 pieces	Buttocks	Right angle	zinc phosphate	90
Sailer I., *et al.* (2006)	3 years	zirconia *	46	AMM 3-5 pieces	Buttocks	Toxoid		84.8
Sailer I., *et al.* (2007)	5 years	Zirconia (Cercon)	57	AMM 3-5 pieces	Buttocks	Toxoid	Resinous (Variolink, Ivoclar Panavia TC, Kuraray)	73.9
Della Bona A., *et al.* (2008)	3 years	Zirconia (In-Ceram Zirconia)	18	SAA 3 pieces	Buttocks	-	Ionomers	94.5
	5 years	Zirconia (Cercon)	33					74
Sailer I., *et al.* (2009)	3 years	Zirconia (Cercon)	76	AMM 3-5 pieces	Buttocks	Toxoid	Resinous (Panavia TC, Kuraray)	100
Sorrentino R., *et al.* (2012)	6 years	Alumina (Procera all ceram alumina)	128	singleton hoops	Anterior	Right angle	Zinc phosphate or resinous	97,6%
					Buttocks			
Kokubo Y., *et al.* (2009)	5 years	Alumina (Procera all ceram alumina)	75	singleton hoops	Anterior	Toxoid	Resinous	97.1
					Buttocks			86.7
Kokubo Y., *et al.* (2011)	5 years	Alumina (In ceram alumina CAD / CAM)	95	singleton hoops	Anterior	Toxoid	Glass ionomer or resinous	96.9
					Buttocks			87.7
Schley JS., *et al.* (Review 2010)	5 years	zirconia *	330	AMM 3-5 pieces	-	-	Glass ionomer or resinous	94.2
Sorrentino R., *et al.* (2012)	5 years	Zirconia (Procera)	48	SAA 3 pieces	Buttocks	Toxoid	Resinous (RelyX Unicem, 3M ESPE)	95.4
Vigolo P., *et al.* (2012)	5 years	Zirconia (Lava system)	20	singleton hoops	Buttocks	Toxoid	Ionomers (Ketac-Cem, 3M ESPE)	85
		Zirconia (Procera)	20					79
Moráguez O., *et al.* (2015)	6.3 years	Zirconia (Nobel Procera Zirconia)	22	singleton hoops	Front and Rear	Toxoid	Ionomers (Ketac-Cem, 3M ESPE) or resinous	89.4
	9.5 years	Alumina (Nobel Procera Alumina)	49					90.9
Tartaglia G., *et al.* (2015)	7 years	zirconia *	130	singleton hoops	Anterior (26)	Toxoid	Ionomers (Ketac-Cem, 3M ESPE)	95
					Rear (104)			
			49	GVA 3-6 pieces	Front (27)			94.7
					Rear (22)			
Le M., *et al.* (Review 2015)	5 years	zirconia *	887	AMM 3-5 pieces	buttocks	-	-	93.3

Pjetursson B., *et al.* (Review 2015)	5 years	Zirconia (Densely Sintered)	1049	singleton hoops	-	-	-	91.2
		Lithium disilicate *	2689					96.6
		Alumina (Glass Infiltrated)	2389					94.6
		Alumina (Densely Sintered)	1099					96
Pjetursson B., *et al.* (Review 2015)	5 years	Zirconia (Densely Sintered)	673	Fixed bridges	-	-	-	90.4
		Lithium disilicate *	208					89.1
		Alumina (Glass Infiltrated)	229					86.2
Kern M. (2016)	15 years	Alumina (In ceram Alumina)	14	GVA Beam	Anterior	-	Zinc Phosphate	95.4
		Zirconia (In ceram Zirkonia)	8					

Table 1

authors	Monitoring time	Skeleton material	Breakage pottery sided (Chipping)	abruption	Skeleton fracture	limit Adjustment
Vult Von Steyern P., *et al.* (2001)	5 years	Alumina (In ceram Alumina)	0%	0%	10%	-
Sailer I., *et al.* (2006)	3 years	zirconia *	13%	2,1%	0%	56.5% vacuo to limit
Sailer I., *et al.* (2007)	5 years	Zirconia (Cercon)	15,2%	1,7%	2,2%	58.7% vacuo to limit
Della Bona A., *et al.* (2008)	3-5 years	Zirconia (In-Ceram Zirconia, Cercon)	15,2%	-	1,7%	-
Sailer I., *et al.* (2009)	3 years	Zirconia (Cercon)	25% (8% clinically. Unacceptable)	-	0%	16.7% vacuo to limit
Sorrentino R., *et al.* (2012)	6 years	Alumina (Procera all ceram alumina)	0,8%	2,3%	0,8%	0%
Kokubo Y., *et al.* (2009)	5 years	Alumina (Procera All Ceram alumina)	4%	-	8%	1.3% marginal vacuo
Schley JS., *et al.* (Review 2010)	5 years	zirconia *	20,6%	2,7%	3,1%	20% clinically unacceptable
Kokubo Y., *et al.* (2011)	5 years	Alumina (In ceram alumina CAD/CAM)	3,1%	-	5,2%	0%
Sorrentino R., *et al.* (2012)	5 years	Zirconia (Procera)	6,3%	-	0%	-
Moráguez O., *et al.* (2015)	6.3 years	Zirconia (Nobel Procera)	7% (7% clinically. Unacceptable)	-	0%	-
	9.5 years	Alumina (Nobel Procera)	14% (7% clinically. Unacceptable)			
Tartaglia G., *et al.* (2015)	7 years	zirconia *	1.8% (front)	5.6% (front)	0%	-
			1.5% (rear)	0% (Rear)		

Le M., *et al.* (Review 2015)	5 years	zirconia *	19,7% (2.2% failure)	2% (0.5% failure)	1,4%	0.1% Discoloration limit
Pjetursson B., *et al.* (Review 2015)	5 years	Zirconia (Densely Sintered)	3,1%	4,7%	0,4%	0% Discoloration limit
		Lithium disilicate *	1,5%	1 %%	1,1%	2.3% Discoloration limit
		Alumina (Glass Infiltrated)	1,8%	0,5%	0,8%	Discoloration 8.3% threshold
		Alumina (Densely Sintered)	3,5%	3,6%	1,1%	0% Discoloration limit
Pjetursson B., *et al.* (Review 2015)	5 years	Zirconia (Densely Sintered)	19,4%	6,2%	1,9%	28,5% discoloration limit
		Lithium disilicate *	5,2%	2,9%	8%	3,5% discoloration limit
		Alumina (Glass Infiltrated)	31,4%	2,6%	12,9%	17,2% discoloration limit
Kern M. (2016)	15 years	Alumina (In ceram Alumina)	0%	0%	11,5%	-
		Zirconia (In ceram Zirkonia)				
Marquadt P., *et al.* (2006)	5 years	Lithium disilicate (Empress 2)	1,7%	-	5,1%	-
Pieger S., *et al.* (Review 2014)	5-10 years	Lithium disilicate *	-	-	-	-
Teichmann M., *et al.* (2016)	5-10 years	Disilicate LiIthio (Empress 2)	16,6% (4.3% failure)	5,2%	10,5%	1.7% vacuo to limit
*: Not listed names						

Table 2: Technical Complications.

Alumina

The survival of single crowns backbone alumina amounts to 90.2 to 99.1% for the monitoring time of 3 to 6 years, with a mean of 97.7% in front and 87.2% in the rear region, while Sorrentino., *et al*. [6] indicate 100% survival of single anterior crown after five years of follow up. The average five-year survival rate GVA three-piece skeleton Alumina is 86.2%, with the highest rates observed in anterior bridges, compared with the corresponding figures of the rear deck area.

The Pjetursson., *et al*. [2] They said the singleton alumina crowns in anterior and posterior teeth with Procera skeleton, survival rates are comparable with the corresponding metal-restorations after 5 years of follow-up, while the rear hoops skeleton In Ceram, there are smaller percentages (mean 90.4%). The same authors in another study (2015) 5 found that survival rates three-piece ceramic bridges are reduced compared with that of metal ceramic restorations, but without statistically significant difference. Conversely, Vult von Steyern., *et al*. [9] important note reduced survival rate of rear three-piece bridges, as compared with the metal.

Technical complications

The most important complication is the fracture rehabilitation, which is either limited to a ceramic coating, or main extends to the backbone. The Vult Von Steyern., *et al*. [9] report that 70-78% of breakages is observed between the coating-frame, said elastic dispute the two materials, with consequent complete detachment of the ceramic coating of the frame. In three-piece bridges a major complication mentioned breakage of the backbone in the coupling area between the span and the distal support, due to increased stress accumulation.

And need to replace the second year of operation covers only one peristatiko [10]. Correspondingly, the color of the restoration it is excellent in an amount from 83.9 to 94.5%, acceptable rate of 3.9 to

16.1% after 5 years parakolouthisi [6,10,11]. The anatomic crown of a square shown in percentage from 93.3 to 98.4%, acceptable in proportion 0-6,7% [6,10,11], with an incident is considered unacceptable and a need to antikatastasis [10].

As for the rear area, the incidence of fractures is increased restorations replacing molars than those they replace premolars [9,11]. The Kokubo., *et al*. [11]. They said all fractures restorations were restorations were sygkolithei with resin cements (Panavia F 2.0). Detachment of recovery refers frequently when zinc phosphate cements are used, provided that the adhesion process is performed accurately following the manufacturer's instructions [6]. The limit embodiment, after 5 years of surveillance, it is excellent in an amount from 68 to 96.8% and acceptable in an amount from 1.5 to 32% [6,10,11].

Finally, the surface morphology is considered excellent in an amount from 92 to 96.6% and acceptable in an amount from 3.4 to 8% [6,10,11], In need of replacement in the first year leitourgias [10].

Biological complications

The occurrence of secondary caries is the most common biological complication (0-2,1% at 5 years) [3,5,9,11]. It has also been reported vitality loss (0-1.06% to 5 year old) [9,11]. A more serious complication is the fracture of the abutment tooth (0-2,6% at 5 years) [3,5,9-11], which is usually located at the root and occurs in increased frequency in endodontically treated dontia [10,11]. Small incidence of inflammation has periodontiou [5,9,10].

Lithium disilicate

The survival of single crowns lithium disilicate amounts to 86.1 to 98.2% for 10 years of follow up, with the larger values corresponding to IPS E-MAX PRESS materials without referring statistically significant difference between the anterior and posterior region. However, Marquart., *et al*. [12] indicate 100% survival of single hoop by EMPRESS [2]. The survival rate for three-piece bridges amounts to 51 to 87.9% for the monitoring time of 10 years, averaging 89.1% at 5 years, while not clear if there is significant difference between restorations of anterior and posterior region.

In all restorations noted excellent color rendition and anatomic. The limit application to teeth braces is acceptable as great as the need to replace these marginal microleakage limited to 3.5% after 5 chronia [5], while the corresponding value is displayed five times on-ceramic alumina and tenfold on Zirconia-ceramic.

Technical Complications

The breakage of the ceramic skeleton is the most important technical complication as required replacement of the restoration. Observed especially in bridges (8%/5 years) [5] With fourfold incidence from the corresponding restorations zirkonias5 rare in singleton flanges (0%/5 chronia [12], 3.8%/5 chronia [13]). Typically, the fracture is located in the rear zone, however Marquardt., *et al*. [12] said backbone breakage mainly anterior bridges, but yielding the result that the small-deficient dimensions of the coupling.

The breakage of the ceramic coating is normal, but repairable intraoral complication, with a maximum frequency of 5.2% at 5 years [5] and 16.6% after 5-10 chronia [13], while the corresponding frequency for the zirconia-ceramic in five reaches 20.6% [14].

Detachment of recovery is observed more rarely and appears to be independent of the cement type used while Bissasu., *et al*. [15] They indicate that the use of resinous cement reinforces the strength of the restoration, in use binder systems.

Biological complications

Secondary caries are the most common biological complication (0.5-3.5% at 5 years) [3,5,13], although the incidence is much lower than that of ceramic zirconia. They also vitality loss (0.7 to 6.1% at 5 years) 3.13 and periodontal disease (2.9 to 9.6% at 5 years) [5,13]. The fracture of the abutment tooth is the most serious complication (0.2 to 1.7% in 5chr.) [3,5,12], in need of replacement of the restoration.

Zirconia

Most bridges Zirconia frame is three-piece rear and related areas. The survival of single hoop Zirconia is 85.1% (79 to 91.2%) after 5-year application. However, there are reports of seven epiviosi [16] 95%, 89.4% survival at 6.3 chronia [17] and 93-100% survival after 3 years of implementation of single crowns Zirkonias [8]. For still bridges Zirconia frame refers survival 93.1% (from 94.5 to 100%) at three years and 87.7% (from 70.5 to 100%) in five years. The Sailer., *et al*. [4] report success 93.67% for GVA three pieces after five years of implementation, while Tartaglia., *et al*. [16] 91,6% after seven years.

Technical Complications

The most common complication that often lead to replacement of the APD zirconia skeleton was breakage of the ceramic coating (chipping). Indicated that the proportion of the ceramic core coating fracture incidence is 19% (13-25%) in the three chronia

[4,18] and 15.7% (from 6.3 to 22%) in five years for still bridges Zirkonias [5,14,19-22] and 3.1% for singletons Zirconia crowns in five years [3]. Further, the Tartaglia., *et al*. [16] said ceramic coating breakage in an amount of 1.5% to 1.8% bridges and crowns in singleton after seven years of operation. When the fracture is limited to the ceramic coating layer is treated by grinding or filling with composite resin, while complete removal of the coating often results in replacement of the APD.

Common complication is the parting of the restorations which amounts to 4.7% for single crowns Zirconia [3] and 3.8% (from 1.7 to 6.2%) for Zirconia bridges after five years efarmogis [5,14,19-22]. The Sailer., *et al*. (2006) report a 18 four-piece bridge detachment (1/46), after three years of implementation, while the same research group said in a later work (2007) 19 4 one-piece bridge detachment (1/57), after five years application. Finally, Tartaglia., *et al*. [16] found a detachment rate of 1.6% after seven years of operation in GVA anterior teeth.

Breakage of Zirconia frame observed extremely rare. The success of the skeleton of zirconia in fixed bridges was estimated at 100% for three years of application [4,18] and 98.6% for five years efarmogis [5,14,19-22]. For singletons crowns frame Zirconia success of the skeleton was 99.6% at 5 years 3 and 100% at 6.3 chronia [17]. In all cases, the breakage of the bridge frame covered bridges five temachion [14,19]. Only Beuer., *et al*. [14] said skeleton snap a three-piece bridge after five years of implementation.

Finally, Pjetursson., *et al*. [3,5] said discolored lone limits hoop Zirconia 0% and 28.5% in Zirconia bridges after five years of use. Moreover, the marginal adaptation of Zirconia bridges by frame becomes unacceptable at a rate of 36.6% after three chronia [4,18] and 39.35% after five chronia [14,19]. Corresponding figures for the metal-bridges is 6.5% after three years.

Biological Implications In biological complications include dental caries, periodontitis, tooth bracket breakage and inflammation pulpal origin. Each of these can lead to tooth extraction support and thus to failure of the restoration.

The occurrence of secondary caries in Zirconia bridges was estimated at 10.9% at three years efarmogis [18] and 7.8% in pentaetia [5,14,19,20]. For singletons Zirconia crowns the caries incidence was 0.5% in the five years3. The Tartaglia., *et al*. [16] observed secondary caries at a rate of 1.1% after seven years of use. All incidents were the last rear GVA, which eventually removed. Generally, there is a reduction of caries occurrence probability in the most recent studies and reviews.

The loss of vitality of teeth braces for GVA Zirconia estimated at 2% in five years for bridges [5,14,19,21,22] (2.4% in trietia [4,18]). For singletons only hoops are Pjetursson., *et al*. [3] reported 0% vitality loss.

The bracket tooth fracture is a complication that leads to loss of ATP. For Zirconia bridges indicated 1.6% in five years, [5,14,19,21,22] (2.1% in three years 18), while for singletons hoops breakage reaches 0.1% at five years 3. According to another research group breakage at 7 years is an average of 4% (0.5% for the frontal and 3.35% for rear APD) [16].

The majority of investigations showed that the ceramic AMM Zirconia exhibit reduced retention plate while various periodontal markers do not show significant difference between different systems Zirconia and Zirconia between the AMM and the conventional metal-AMM. The bracket tooth loss to Zirconia bridges periodontal problems were estimated at 0.17% after 5 years of application [5,14,21,22].

Discussion

Alumina

Survival rates of single hoop alumina anterior region seem comparable to the corresponding metal ceramic, and as the aesthetic advantage that exhibit, their use in the anterior aesthetic zone is acceptable and often necessary. The survival of single crowns alumina in the rear region is high on-ceramic Procera and comparable to the corresponding metal ceramic, provided a favorable occlusal shape with a uniform distribution of dynameon [17]. The corresponding percentages for-ceramic skeleton In Ceram is smaller, raising questions about the selection tous [9,11]. Regarding the three-unit bridges, the results are encouraging for restorations in the anterior region, but their use in the posterior region is currently uncertain.

The most important complication of restorations alumina is breakage of the ceramic backbone, resulting in the need to replace the recovery. Observed mainly on bridges and usually in the rear area at the distal link, because it works as an area of increased stress accumulation. The 70-78% of fractures located between the ceramic skeleton and aesthetic appearance due to trends that develop when operating at the interface of two different materials, given the different elastic deformation. This has as a consequence the complete detachment of the ceramic coating of the correction and the need of replacement. Finally, partial thickness fracture the coating aesthetics can be observed, which is repaired intraorally without referring further complication in tracking time of five years

[3,5,6,9-11,17]. The Vult Von Steyern., *et al*. [9] mentioned that the preparation of the cervical termination tooth type bevelled right angle mounting, increases up to three times the risk of breakage of recovery compared to the arcuate pedestal.

Also observed increased incidence of debonding of the restoration when using zinc phosphate cement6. The cements of this class rather than ease of use, significantly lag behind the breaking strength and wear, to limit occlusion and the final color yield of recovery compared to the resin cements, while being "unfriendly" for the glass ceramic because oxytitas6. The resinous cements appear to enhance recovery, to prevent the detachment of the tooth holder and to reduce marginal microleakage. Therefore, to increase the survival rates of the alumina ceramic is recommended to use resinous konion [6].

The most serious complication biological, although more rarely, by the breakage of the tooth, especially the root, which indicates the need for proper selection of supports tooth [3,5,6,9-11]. Most commonly observed occurrence of secondary caries, particularly the limits and loss of vitality donation [3,5,9,11]. Periodontal lesions rarely occurred, but to all investigations is selected, non-smoking patients with good to excellent oral ygieini [5,9,10].

Color, surface and anatomical restorations are considered in most cases acceptable as exceptional and patients say completely happy after five years monitoring [6,10,11].

The use of alumina-ceramic recommended for anterior and posterior singlets crowns and three-unit bridges by the premolar area, due to the increased probability of breakage in the area of the molars and in accordance with Vult Von Steyern., *et al*. [9] and Kokubo., *et al*. [10,11]

lithium disilicate

The survival of all-ceramic lithium disilicate crowns is comparable with that of metal ceramic restorations for ten years follow-up [23]. The lithium disilicate bridges exhibit lower survival rates, and there are doubts and questions for use in posterior periochi [12,13,23]. In comparison, however, the metal-but also to ceramic restorations alumina and zirconia, lithium disilicate restorations showing important aesthetic pleonektima [3,5] due to increased translucency of ylikou [24]. Therefore, it seems to be a reliable and aesthetic solution for restoring anterior region. Their use is recommended in the anterior aesthetic zone in singleton crowns and three-unit bridges.

An important advantage appears to have also in the marginal embodiment, as this is shown as 10 times better than that of zirconia restorations. In biological complications include: caries, vitality loss, periodontal inflammation and bracket tooth fracture, but the incidence is reduced.

Most commonly observed technical complications, the most important break of the ceramic skeleton still in bridges, almost four times more often than the figure recorded in Zirconia restorations5. Found mostly in the area of posterior bridges link, without excluding the fracture and anterior apokatastaseon [12,13]. In singleton hoops breakage of the carcass occurs less frequently. The breakage of the ceramic coating is the most frequent complication art, capable intraoral repair in most cases, no need for replacement of the restoration. Detachment of the restoration referred rarely, with 1 to 5.2% retention loss at five years [3,5,13], whereas it appears that this is independent of the cement type used.

Zirconia

The review of the literature is clear that the SAA with Zirconia frame can be a viable alternative to conventional metal-ceramic. However, the rear Zirconia bridges mainly restorations three or four pieces, while longer bridges have more complications [14,19].

In more longitudinal studies indicated 67.2% survival of single hoop 10 years with the detachment of the ceramic coating to be the major complication [24]. While Sax., *et al*. They reported a 67% survival in the decade GVA 3-5 temachion [25].

For GVA Zirconia most common complication is still breaking the ceramic coating. Most, however, sometimes the fracture is limited to the ceramic coating layer and may be repaired with endostomatikileiansi. Detachment of the ceramic coating over its entire thickness may result in loss of ATP. Better results are expected to provide the monolithic zirconia, however, this material is not an object of study of this work. Frequent complication, also, and the appearance of secondary caries in GVA limits. Some researchers attribute the increased incidence of this in relation to metal-CAA, the reduced marginal adaptation of Zirconia GVA. Nevertheless.

Patients seem to indicate 100% satisfied with the aesthetics of GVA Zirconia three [18] and five chronia [19]. While the functional acceptance of GVA Zirconia reaches 94.4% in the three years [18] and 91.7% in the five chronia [19]. However, most studies have small viewing time (3-5 years) which demonstrates the need to develop long-term clinical studies.

It seems, then, that singleton Zirconia crowns can be used both in front and in rear areas. The same goes for Zirconia bridges when they are up to four pieces.

Conclusions

The findings resulting from the literature review are:

- The singleton hoops lithium disilicate exhibit higher survival (96%) and the corresponding of Alumina (93%) and finally those of Zirconia (86.6%) at 5 years.
- For bridges the highest survival regards Zirconia (87.7%) and alumina (86.2%) and lithium disilicate (77%) at 5 years.
- The GVA ceramic made of the three studied ceramics are advantageous to aesthetics and biocompatibility compared to metal ceramic.
- The ceramic lithium disilicate exhibit excellent aesthetic and better implementation marginal compared to ceramics Alumina and Zirconia.
- The fracture of ceramic coating is the most common, but usually repairable technical complication of all-ceramic lithium disilicate Alumina and Zirconia.
- Tooth decay is the most common complication for biological ceramic GVA, especially in GVA Zirconia.
- Ceramic Alumina have a durable ceramic core which imparts resistance to recovery, satisfactory aesthetics and acceptable limit applying to the tooth holder.

Zirconia ceramics consist of a strong ceramic core, making restorations resistant to breakage, even of rear bridges, but observed an intense phenomenon of crushing of the aesthetic material.

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