

Goiter in Brazilian modernism paintings

Bócio em pinturas da arte moderna brasileira

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ABSTRACT

Objective: To evaluate Di Cavalcanti's artworks in which goiters are represented before and after the introduction of iodized salt to the Brazilian population. **Methods:** One hundred and thirty paintings by Di Cavalcanti from the 20's to 70's demonstrating necks were evaluated. All the paintings were observed in reproductions. The neck circumference in the paintings was measured. Since there were no standard thresholds of neck circumference, cutoffs were based on the median. Baseline characteristics of artworks were compared based on high and normal neck circumference categories using Student's *t*-test, Mann-Whitney-Wilcoxon test, or chi square test. **Results:** We analyzed 29 artworks which portray the neck of 60 women (84.5%), 8 men (11.3%) and 3 children (4.2%). The analyses of the neck circumference showed 23.3% of women (14/60), 12.5% of men (1/8), and 33.3% of children (1/3) with an abnormal profile of the neck circumference. The neck circumference ratio in 29 paintings showed that the relative sizes of the necks painted between the 1920's and 1950's ($r=0.45$; $p=0.03$), and painted between the 1960's and 70's ($r=0.54$; $p=0.003$) have linearly decreased. The decades in which the artworks were painted explained 40.0% of the variation in size of the neck circumference ($p=0.002$). **Conclusion:** Art imitates life. Di Cavalcanti was not a physician, and probably did not have the intention to illustrate a pathological condition, although the images observed in this study should be considered as goiter or enlarged neck.

Keywords: Goiter; Neck; Paintings; Medicine in the arts.

RESUMO

Objetivo: Avaliar as obras de Di Cavalcanti em que bócios estão representados, antes e após a introdução da iodação do sal para a população brasileira. **Método:** Foram avaliadas 130 pinturas de Di Cavalcanti entre os anos 1920 e 1970 demonstrando pescoços. Todas as pinturas foram observadas em reproduções. A circunferência do pescoço nas pinturas foi mensurada. Como não existia limite-padrão da circunferência do pescoço, os limites foram baseados na mediana. As características básicas das obras de arte foram comparadas por categorias da circunferência do pescoço em elevadas e normais, usando o teste *t* de Student, o teste de Mann-Whitney-Wilcoxon ou o teste qui-quadrado. **Resultados:** Analisamos 29 obras de arte que representavam o pescoço de 60 mulheres (84,5%), 8 homens (11,3%) e 3 crianças (4,2%). Ao analisar a circunferência do pescoço, 23,3% das mulheres (14/60), 12,5% dos homens (1/8) e 33,3% das crianças (1/3) demonstraram perfil anormal dela. A relação da circunferência do pescoço em 29 pinturas demonstrou que as circunferências do pescoço relativas aos pescoços pintados entre os anos 1920 e 1950 ($r=0,45$; $p=0,03$) e pintados entre os anos 1960 e 1970 ($r=0,54$; $p=0,003$) reduziram linearmente. As décadas em que as obra foram pintadas explicaram 40,0% da variação no tamanho da circunferência do pescoço ($p=0,002$). **Conclusão:** A arte imita a vida. Di Cavalcanti não era médico e, provavelmente, não tinha intenção de ilustrar uma condição patológica, embora as observações das imagens, neste estudo, tenham sido consideradas como bócio ou com aumento de volume do pescoço.

Descritores: Bócio; Pinturas; Medicina nas artes.

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INTRODUCTION

Goiters are found in artworks of many countries, represented mainly by paintings and statues. In America goiters were identified in statues of Mochina's time, and in Brazil the French Jean-Baptiste Debret describes goiters in black slave women at the work 'Picturesque and Historical Trip in Brazil'.⁽¹⁾

The Week of Modern Art in February of 1922 was a landmark event where Brazilian artists discussed the construction of a new culture, and of the historical point of view that started Brazilian Modernism. Emiliano Augusto Cavalcanti de Albuquerque Melo (1897–1976), known simply as Di Cavalcanti, a famous Brazilian modernist painter, sought to produce a form of Brazilian art that was free from any noticeable European influences. Fascinated by the everyday life of Brazilians, Di Cavalcanti painted the women of the society of his time.

The prevalence of endemic goiter secondary to iodine deficiency disorders was a serious public health problem in Brazil, and in 1956 the introduction of iodized salt for entire Brazil's population was started.⁽²⁾ In the 1960s it was noted that the iodized cooking salt program developed by the Ministry of Public Health had failures due to logistical problems.⁽³⁾ Currently, Brazil is considered a country in which iodine intake is more than sufficient.⁽⁴⁾

This study shows Di Cavalcanti's artworks in which presumed medical-artistic diagnosis of goiter are represented, before and after the introduction of iodized salt to the whole Brazilian population.

METHODS

One hundred and thirty paintings by Di Cavalcanti from the 20's to 70's of the last century demonstrating the cervical region, with 29 paintings being the subject of this observational evaluation. All the paintings were observed in reproductions (<http://www.dicavalcanti.com.br/obras.htm>). The neck circumference (NC) in the paintings was measured in each work by $2\pi R$ (Figure 1). To account for the varying dimensions of the paintings, the NC average was indexed based on the NC average of the necks depicted in the paintings. An index of 3.3 for the NC would indicate that the size of the goiter was twice the circumference size average of the neck.

Baseline characteristics of the artworks were compared by high and normal NC categories using Student's t-test, Mann-Whitney-Wilcoxon test, or chi square test. Since there were no standard thresholds, cutoffs were based on the median. All results were expressed as mean standard deviation. A p-value < 0.05 was considered to be significant.



Source: Di Cavalcanti.⁽⁵⁾

Figure 1. Family on the Beach (1935).

RESULTS

The main works by Di Cavalcanti are paintings with women. We analyzed 29 artworks showing 60 women (84.5%), 8 men (11.3%), and 3 children (4.2%). The analyses of the NC identified 23.3% of women (14/60), 12.5% of men (1/8), and 33.3% (1/3) demonstrating an abnormal profile of the NC. The NC ratio in 29 paintings showed that the relative sizes of the necks painted between the 20's and 50's ($r = 0.45$; $p = 0.03$), and painted between the 60's and 70's ($r = 0.54$; $p = 0.003$) have linearly decreased. The date of the painting explained 40.0% of the variation in the size of the NC ($p = 0.002$).

Consistent with expectations, the size of the NC depicted in these paintings decreased with time. Of the 16 paintings suggestive of goiter, 13 were painted between the 20's and 50's of the last century (period of iodine deficiency in Brazil), and 3 between the 60's and 70s of the last century.

The year in which painting was completed accounts for 27.0% of the variation in size of the NC using a linear model. A nonlinear regression accounts for 41.0% of this variation because of the sharper decrease in NC relative size from 30's to 60's.

For purposes of illustration the necks are collated in combined images (Figure 2).

DISCUSSION

The presence of goiter has been known since ancient times, being illustrated in several depictions of paintings and sculptures in artwork by artists who probably lived in endemic regions and illustrated the reality they met, transferring the disease to panels, walls and canvas. It is one of the most frequent endocrine pathologies portrayed in ancient paintings.⁽⁷⁾ Analyzing the necks sizes in artwork can provide a creative investigation of other engaging questions that are either longitudinal or cross-cultural.



Source: Di Cavalcanti.⁽⁶⁾

Figure 2. Paintings by Di Cavalcanti. (A) *Pierrot* - 1924 Guache, 30×22cm. Reproduction. Pag. 27 of the book *Emiliano Di Cavalcanti 50 years of painting 1922–1971 and reprint of 1976 p. 31 and Cat. Christie's New York, November 26, 1996 of the auction of Aleksander and Lucja Landau's Collection, p. 22 under no. 55.* (B) *Circus* oil on canvas, 100×80cm, 1968. Reproduction. In the book *"Di Cavalcanti - 50 Years of Painting 1922 - 1971"*. (C) *Nude and Oil on Canvas Figures*, 40's. C. *Settlers* oil on canvas, 60×90cm, circa 1945. (D) *Mulatas* oil on carton, 50×39cm, 1927. Reproduced in the book *"Emiliano Di Cavalcanti – 50 Years of Painting – 1922-1971"*. (E) *Abigail* oil on canvas, 65×45cm, 1947.

Individuals with enlarged neck are evidenced in many artworks, and goiter was frequently portrayed in paintings in several artworks from endemic areas of iodine deficit.^(8,9) The present investigation aimed to evaluate Di Cavalcanti's artworks in which goiter is represented before and after the introduction of iodized salt to the Brazilian population.

It seems that the famous painters inadvertently portrayed goiter ignoring its implicit pathological condition, but there must be other reasons why these artists included goiter in their artwork.^(10,11)

Di Cavalcanti was one of the greatest artists of Brazilian modernism, and participated in the construction of the national identity through the reformulation of Brazilian art and culture, producing artwork that was free from any European influences.⁽¹²⁾ A closer look at some paintings by Di Cavalcanti shows us neck alterations in the depiction of the women he painted on his canvases.

Iodine supplementation was proposed 170 years ago, due the iodine deficiency in the population; it was so severe that in the 1920's some countries around the world began adding iodine to table salt to prevent several consequences of iodine deficiency. However, in Brazil, salt iodination has only been initiated in the 1950's,

but the amount of iodine added to salt has been changing since then.⁽¹³⁾

Seduced by the Brazilians' daily routine, Di Cavalcanti noticed the women of the society of his time, since very many representations are found within the works he produced. Thus, a NC analysis in the paintings by Di Cavalcanti in the history of modern art may be useful for our purpose, because Di Cavalcanti portrays women with an abnormal profile of the neck, with enlargement or swelling, suggestive of goiter, coincidentally before the 1950's, period before the introduction of iodized salt to the Brazilian population. Di Cavalcanti may have unintentionally depicted the enlargement of the neck, or may have made it as an erotic attribute, since some generations of painters did that to create an idealized beauty with a more seductive neck.⁽⁸⁾

In Brazil, the consumption of iodized salt added to daily food from the 1950s onwards has had considerable results in reducing goiter, of 24.6% of the Brazilian goitrous children in 1955 to 14.7% of the children with palpable goiters in 1975,⁽²⁾ and this was reflected in Di Cavalcanti's artworks, as demonstrated in our evaluation.

CONCLUSION

Art imitates life. Di Cavalcanti was not a physician, and probably did not have the intention to illustrate a pathological condition, though the observations of the images in this study should be considered as goiter or thick neck.

REFERENCES

1. Botelho JB. [Goiter in works of art in particular in the watercolors of Jean-Baptiste Debret from Rio de Janeiro]. *Hist Sci Med.* 2008;42(3):26572. French.
2. Medeiros-Neto G. Iodine nutrition in Brazil: where do we stand? *Arq Bras Endocrinol Metabol.* 2009;53(4):470-4.
3. Medeiros-Neto GA. Towards the eradication of iodine-deficiency disorders in Brazil through a salt iodination programme. *Bull World Health Organ.* 1988;66(5):637-42.
4. Camargo RY, Tomimori EK, Neves SC, GS Rubio I, Galvão AL, Knobel M, et al. Thyroid and the environment: exposure to excessive nutritional iodine increases the prevalence of thyroid disorders in Sao Paulo, Brazil. *Eur J Endocrinol.* 2008;159(3):293-9.
5. Di Cavalcanti: Vida e obras [Internet]. [citado 2018 Nov 21]. Available from: <http://www.dicavalcanti.com.br/dec20.htm>
6. Di Cavalcanti: o enamorado da vida [Internet]. [citado 2018 Nov 21]. Available from: <http://www.dicavalcanti.com.br/apresentacao.htm>
7. Niazi AK, Kalra S, Irfan A, Islam A. Thyroidology over the ages. *Indian J Endocrinol Metab.* 2011;15(Suppl 2):S121-6.
8. Lazzeri D, Pozzilli P, Zhang YX, Persichetti P. Goiter in paintings by Rogier van der Weyden (1399-1464). *Thyroid.* 2015;25(5):559-62.
9. Ferriss JB. The many reasons why goiter is seen in old paintings. *Thyroid.* 2008;18(4):387-93.

10. Giampalmo A, Fulcheri E. An investigation of endemic goitre during the centuries in sacral figurative arts. *Zentralbl Allg Pathol*. 1988;134(3):297-307.
11. Dionigi G, Dionigi R. Iconography of goiter: four refined examples in the Sacred Mountain of Varese, Italy. *Thyroid*. 2013;23(10):1301-4.
12. Avancini JA. A pintura modernista e o problema da identidade cultural brasileira: estudo comparativo da obra de Tarsila, Di Cavalcanti e Rego Monteiro, 1911-1933 [dissertação]. São Paulo: Escola de Comunicação e Arte da USP; 1982.
13. Lotufo PA. Thyroid disorders in Brazil: time for action. *Sao Paulo Med J*. 2016;134(4):277-9.