





Translation into Brazilian Portuguese and Cultural Adaptation of the Component Scores Definition from the Modified Barium Swallow Impairment Profile (MBSImP™)

Tradução para o português brasileiro e adaptação cultural da Definição de Pontuações de Componentes (Component Scores Definition) pertencentes ao Modified Barium Swallow Impairment Profile – MBSImP™

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ABSTRACT

Purpose: Translate into Brazilian Portuguese and culturally adapt the component scores definition from the *Modified Barium Swallow Impairment Profile* – MBSImP videofluoroscopy protocol. **Methods:** This study was conducted based on international guidelines for creation, translation and transcultural adaptation according to domestic publications for the validation of international speech-language pathology tests. A specialist committee was convened with two otorhinolaryngologists and three speech-language pathologists familiar with videofluoroscopy examinations. Translation into Brazilian Portuguese was carried out by two otorhinolaryngologists with subsequent back translation performed independently by two U.S.-born translators. The final Brazilian Portuguese version was written by speech-language pathologists after revision of translations and back translations resolved semantic, idiomatic, conceptual, linguistic and contextual inconsistencies. This version was tested by committee members, who assessed subjects with no disease, with head and neck cancer and with mild cognitive impairment. **Results:** Translation of the component scores definition from MBSImP was performed independently and translators agreed on a final version. The MBSImP protocol was renamed “Martin-Harris scale for swallowing videofluoroscopy”. Some terms were adapted for the final Brazilian Portuguese version. Use of the translated protocol did not reveal any deviations from the original. **Conclusion:** Translation of the MBSImP fragment into Brazilian Portuguese was consistent with the original version. Approval from specialist committee members refined the protocol adaptation, allowing precise concepts to be accurately translated.

RESUMO

Objetivo: Traduzir para o português brasileiro e adaptar culturalmente a definição dos componentes e pontuação (Component Scores Definition) pertencentes ao protocolo para videofluoroscopia *Modified Barium Swallow Impairment* – MBSImP™. **Método:** Este estudo foi desenvolvido com base nas recomendações internacionais para elaboração, tradução e adaptação transcultural em consonância com publicações nacionais para validação de testes internacionais em Fonoaudiologia. Foi formado um comitê de especialistas, composto por dois médicos otorrinolaringologistas e três fonoaudiólogas conhecedoras do exame de videofluoroscopia. A tradução para o português brasileiro foi realizada por dois otorrinolaringologistas com retrotradução de forma independente por dois nativos norte-americanos. A versão final em português brasileiro foi elaborada pelas fonoaudiólogas após a revisão das traduções e das retrotraduções com resolução de discrepâncias semânticas, idiomáticas, conceituais, linguísticas e contextuais. Essa versão foi testada pelas fonoaudiólogas membros do Comitê, que avaliaram indivíduos sem doença, com Câncer de Cabeça e Pescoço e Comprometimento Cognitivo Leve. **Resultados:** A tradução da definição dos componentes e pontuação do MBSImP foi realizada de forma independente e os tradutores chegaram a um consenso para a versão final. O protocolo original *Modified Barium Swallow Impairment*, foi traduzido para “Escala Martin-Harris para videofluoroscopia da deglutição”. Na versão final em português brasileiro alguns termos foram adaptados. A aplicação do protocolo traduzido não apresentou discrepâncias em relação ao protocolo original. **Conclusão:** A tradução do excerto do protocolo MBSImP para o português brasileiro foi compatível com a versão original. A certificação de membros do comitê favoreceu a adaptação do material, permitindo a adaptação conceitual.

Study conducted at Universidade Estadual de Campinas – UNICAMP - Campinas (SP), Brasil.

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INTRODUCTION

Videofluoroscopy of the swallowing function (VFS) is an instrumental assessment tool to visualize deglutition physiology, dynamically capturing food passage through the oral cavity, pharynx and esophagus. VFS is regarded as the gold standard in assessing the swallowing function⁽¹⁾. However, the use of standardized protocols for performing the assessment and interpreting the results is not widespread in clinical and academic practices.

Assessing the swallowing function is done by analyzing images generated by the fluoroscope, a device capable of x-ray video recording at least at 30 frames per second. When less than 30 fps is used, some events cannot be captured during swallowing of barium sulfate contrast medium. These images can be recorded for further analysis and reviewed without subjecting patients to new assessments, while also reducing their exposure to radiation^(2,3). VFS can provide information about structures and biomechanics of deglutition, besides pinpoint instances of stasis, penetration and/or aspiration in different places, degrees and times. Apart from diagnosing possible alterations in swallowing physiology, the examination allows testing of varied therapeutic approaches (seeking more adequate consistencies, utensils and postural maneuvers) and management of oropharyngeal dysphagia during rehabilitation⁽⁴⁾. The Brazilian Federal Council of Speech Pathology, through Law No. 6 965/81, decree No. 87 218/82 and its bylaws, recommends that speech pathologists performing VFS be capable of “(...) executing suitable instrumental evaluations according to currently employed protocols”⁽⁵⁾.

One of the first VFS protocols was proposed by Logemann in 1993, and many assessments continue to follow its guidelines regarding consistencies, volume, administration procedures and patient positioning⁽⁶⁾. Today, however, there are many diverse methodologies used by investigators concerning the interpretation of physiological aspects, with modifications introduced by radiology services or even academic research. Because of this, the selection of components and interpretation of VFS results do not follow a common terminology amongst professionals. A study in Brazil that intended to analyze and compare the use of Brazilian and American VFS protocols in patients with a history of cerebrovascular accidents concluded that most local papers do not sufficiently describe the employed methodology, while the same is not true in foreign studies. Nonetheless, no adequate standardization for the fluoroscopic assessment was found in any of them⁽⁷⁾.

Even though VFS is an instrumental examination, in order to interpret its results, the speech-language pathologist must subjectively judge the visuoperceptive features of resulting images based on defined deglutition components to establish an analysis framework⁽¹⁾.

When VFS protocols are standardized, validated and interpreted by trained personnel, strategies for rehabilitation may be put in place and communicated more consistently among different specialists, positively impacting the therapeutic process.

Furthermore, the use of a standardized protocol in academic research supports reproducibility⁽⁶⁾. Therefore, several initiatives were created to systematize VFS assessments.

A few examples of these tools are the “Functional Dysphagia Scale (FDS)”, conceived in 2001 by Korean researchers to analyze 11 swallowing components⁽⁸⁾; “A Videofluoroscopic Dysphagia Scale (VDS)”, devised in 2008 by the same investigators and expanded to 14 components⁽⁹⁾; “Modified Barium Swallow Impairment Profile (MBSImP)”, published in 2008 by United States researchers to evaluate 17 components⁽¹⁰⁾ and “Dynamic Imaging Grade of Swallowing Toxicity (DIGEST)”, presented in 2017, also by American scientists, analyzing two components⁽¹¹⁾. While FDS and VDS protocols were initially conceived to be used in post-stroke patients and DIGEST was directed to head and neck cancer subjects, MBSImP was tested in adult inpatients and outpatients with diverse medical and surgical backgrounds⁽¹²⁾.

Although the use of each protocol presents challenges regarding their psychometric properties and there hasn't been a consensus as to how to interpret VFS results⁽¹⁾, MBSImP is currently acknowledged as a protocol that favors standardized swallowing assessments, and is widely employed by speech pathologists and radiologists since 2008 in several countries^(12,13). MBSImP was originally developed by a NIH-funded study and field tested for 13 years⁽¹³⁾, presenting, in its validation report, 80% for both inter- and intra-examiner reliabilities⁽¹⁴⁾.

According to MBSImP authors, the use of a standardized protocol allows to determine the presence, type and severity of swallowing impairment, establishes the efficiency of oral ingestion and safety of airways and aids observation of intervention outcomes such as postural and airway protection maneuvers, assisting further therapeutic planning^(12,13).

MBSImP evaluates 17 physiological components of swallowing: six regarding the oral phase, ten related to the pharyngeal phase and one corresponding to the esophageal phase. For each component, there are increasing degrees of alteration, representing higher impairment levels observed during swallowing tasks listed in the protocol. These degrees are added to obtain a final score for each swallowing phase, without attributing a general, global score. Totals for the oral phase range from 0 (normal) to 22 (severe impairment); pharyngeal phase ranges from 0 (normal) to 29 (severe impairment) and esophageal phase ranges from 0 (normal) to 4 (severe impairment)⁽¹⁴⁾.

The 12 swallowing tasks patients must perform are defined in the protocol guide. The authors detail the consistencies and the order they should be offered to patients. Instructions to the patient, ways of presenting the medium and patient positioning are also discussed. Additionally, there are detailed descriptions to enable the speech pathologist to attribute degrees following established criteria related to physiological swallowing events. Authors also provide, in the aforementioned guide, directions to specific situations, such as patients without some anatomical structures or making use of an alternative feeding method, adoption of compensatory techniques, consistencies best avoided for safety reasons and problems in image capturing, among others⁽¹⁴⁾.

Aiming to diagnose the incidence of penetration and aspiration during examinations, MBSImP considers the use of a scale developed by Rosenbek and collaborators⁽¹⁵⁾ jointly with the protocol. This scale has eight levels, with the first two considered as normal⁽¹⁶⁾. Levels 3 to 5 indicate laryngeal penetration due to residue in the airways and contact with vocal folds. Levels 6 to 8 refer to laryngotracheal aspiration corresponding to the cough physiological response to this aspiration^(15,16).

In order to effectively use MBSImP, one has to be registered as an “MBSImP clinician”, which can only be done after completion and approval in a course offered by the protocol authors. Training provides audiovisual resources with activities to guide score assignment for each component⁽¹⁴⁾. There are over 9,000 currently in training and 5, 809 registered speech pathologists in 25 countries. In Brazil, there are only four certified speech pathologists so far, and two of them contributed to this report.

METHODS

The purpose of this study was to translate into Brazilian Portuguese and culturally adapt the component scores definition for the MBSImP videofluoroscopy protocol. It was developed based on international guidelines for creation, translation and transcultural adaptation⁽¹⁷⁾ according to domestic publications for the validation of international speech-language pathology tests⁽¹⁸⁾.

Pre-testing of the final Brazilian Portuguese version (FBPV) was conducted in two doctoral studies from the Medical Sciences Faculty of the University of Campinas (UNICAMP). The “Complaint and dysphagia risk assessment versus physiological swallowing results in head and neck cancer” study was run in the Department of Otorhinolaryngology – Head and Neck Cancer and approved by the ethics committee under No. 58313016.6.000.5404. The second study, “Correlations between swallowing components, structural and functional connectivities” is underway in the Department of Human Development and Rehabilitation, and was approved by the ethics committee under No. 72644417.8.0000.5404. All patients read and signed a free and clarified consent term.

Step 1: translation

After obtaining written permission from the original protocol authors, a specialist committee was convened to compose the Brazilian Portuguese version. It was constituted by two otorhinolaryngologists and three speech-language pathologists familiar with VFS and the purpose of this work. Both otorhinolaryngologists, bilingual in Brazilian Portuguese and English and native in the target language and culture, independently translated the protocol (TP1, TP2) taking into account conceptual equivalences and avoiding literal conversions. As advocated by international guidelines⁽¹⁷⁾, one of the physicians had greater fluency with the protocol as a consequence of his academic duties next to speech-language pathologists who regularly employ it.

Step 2: synthesis of translations

Based on TP1 and TP2, speech-language pathologist members of the specialist committee reached a consensus and combined the previous translations to create the Brazilian Portuguese synthesized version (BPSV), addressing semantic, idiomatic, conceptual, linguistic and contextual discrepancies.

Step 3: back translation

To ensure the Brazilian Portuguese version consistently reflected the original protocol⁽¹⁸⁾, BPSV was back translated into English. It was performed by two independent native translators without any knowledge of the original protocol and unfamiliar with its contents and concepts.

Step 4: analysis by the specialist committee and back translated version

Speech-language pathologists from the committee compared both back translated versions (BT1, BT2) with the original protocol, assessing semantic, idiomatic, conceptual, linguistic and contextual discrepancies. After a consensus was reached, a back translated version (BTV) was provided to the original authors.

Step 5: final Brazilian Portuguese version

The speech-language pathologist committee members reviewed all translated (TP1, TP2, BPSV) and back translated (BT1, BT2, BTV) versions to develop the definitive form of the translated protocol. After addressing any remaining inconsistencies, they created the final Brazilian Portuguese version (FBPV).

Step 6: testing of the final Brazilian Portuguese version

The last step of the adaptation process was pre-testing the translated protocol⁽¹⁷⁾. It was performed by using the FBPV in two doctoral studies approved by a research ethics committee and conducted by MBSImP certified speech-language pathologists who were members of the specialist committee. Both studies were carried out in the Medical Sciences Faculty of the University of Campinas. The translated protocol was used to evaluate VFS from three subject groups: without neurological disease (n = 28), with mild cognitive impairment (n = 15) and patients treated for head and neck cancer (n = 58).

RESULTS

Both independent translations into Brazilian Portuguese and the synthesized version described in steps 1 and 2 are presented in Chart 1 (TP1, TP2, BPSV), followed by the final Brazilian Portuguese version (FBPV), detailed in step 5.

Independent back translations (BT1, BT2) and the final back translated version (BTV) described in steps 3 and 4 are presented in Chart 2 together with the original MBSImP protocol.

Chart 1. Translation into Brazilian Portuguese (TP1, TP2), Brazilian Portuguese synthesized version (BPSV) and final Brazilian Portuguese version (FBPV)

TP1 – Perfil de disfagia no deglütograma modificado de bário: componentes, pontuação e definição de pontuação	TP2 – Perfil modificado das alterações da deglütção de bário: componentes, pontuação e definição de pontuação
Deficiência oral	Alteração oral
Componente 1 – Vedamento labial	Componente 1 – Fechamento labial
Julgue qualquer ponto durante a deglütção.	Avalie em qualquer momento da deglütção.
0 = Sem escape labial	0 = Sem escape labial
1 = Escape interlabial; sem progressão para lábio anterior	1 = Escape interlabial; sem progressão anterior para os lábios
2 = Escape de espaço interlabial ou comissura labial; sem extensão além da borda do vermelhão	2 = Escape pelo espaço interlabial ou comissura labial; sem extensão além da borda do vermelhão dos lábios
3 = Escape progredindo para meio do queixo	3 = Escape com progressão até o meio da região mentoniana
4 = Escape além do meio do queixo	4 = Escape além do meio da região mentoniana
Componente 2 – Controle lingual de bolo alimentar	Componente 2 – Controle lingual durante a contenção do bolo
Julgue na contenção de bolo líquido apenas e antes de qualquer movimento da língua.	Avalie durante apenas a contenção do bolo líquido e antes dos movimentos linguais efetivos.
0 = Bolo coesivo entre língua e selamento palatal	0 = Bolo contido entre a língua e o fechamento palatal
1 = Escape para cavidade bucal lateral/ assoalho de boca	1 = Escape lateral para a cavidade bucal/ soalho da boca
2 = Escape posterior menor que metade do bolo	2 = Escape posterior de menos que a metade do bolo
3 = Escape posterior maior que metade do bolo	3 = Escape posterior de mais da metade do bolo
Componente 3 – Preparação / mastigação do bolo	Componente 3 – Preparação do bolo/ mastigação
Julgue apenas durante meio “cookie” seco revestido com pudim.	Avalie apenas durante o oferecimento de ½ biscoito friável envolto em alimento de consistência pudim.
0 = Mastigação e trituração eficiente conveniente	0 = Mastigação e trituração eficientes e com duração adequada
1 = Mastigação/ trituração lenta prolongada com re-coleção completa	1 = Mastigação/ trituração lenta, prolongada com organização completa do bolo
2 = Mastigação/trituração desorganizada com pedaços sólidos não mastigados	2 = Mastigação/trituração desordenada com persistência de fragmentos sólidos no bolo
3 = Mastigação/trituração mínima com maioria do bolo não mastigado	3 = Mastigação/trituração mínima com permanência da maior parte do bolo em estado não mastigado
Componente 4 – Transporte de bolo / movimento lingual	Componente 4 – Transporte do bolo/ mobilidade lingual
Julgue após primeiro movimento produtivo de língua para transporte de bolo na cavidade oral.	Avalie depois do primeiro movimento lingual produtivo para o transporte do bolo.
0 = Movimento de língua vigoroso	0 = Movimentos linguais vigorosos
1 = Início tardio de movimento de língua	1 = Início atrasado dos movimentos linguais
2 = Movimento de língua lento	2 = Movimentos linguais lentos
3 = Movimento de língua repetitivo ou desorganizado	3 = Movimentos linguais repetitivos e desordenados
4 = Movimento de língua ausente	4 = Movimentos linguais mínimos ou ausentes
Componente 5 – Resíduo oral	Componente 5 – Resíduo oral
Julgue após primeira tentativa de deglütção ou após última tentativa de deglütção na sequência de exercícios de deglütção.	Avalie após a primeira deglütção ou depois da última deglütção numa sequência de tentativas de deglütção.
0 = Sem resíduo oral	0 = Clareamento oral complete
1 = Traços de resíduos delineando estruturas orais	1 = Traços de resíduos revestindo as estruturas orais
2 = Resíduo de bolo em estruturas orais	2 = Coleção de resíduos nas estruturas orais
3 = Persistência de maioria do bolo	3 = Permanência da maior parte do bolo
4 = Clareamento mínimo ou ausente	4 = Clareamento mínimo ou ausente
Localização: A= Soalho da boca B = Boca C = Língua D = Sulcos laterais	Localização: A = Soalho da boca B = Boca C = Língua D = Sulcos laterais
Componente 6 – Iniciação da fase faríngea da deglütção	Componente 6 – Iniciação da deglütção faríngea
Julgue ao primeiro movimento vigoroso da trajetória superior-anterior do osso hioide.	Avalie ao primeiro movimento vigoroso de deslocamento súpero-anterior do hioide.
0 = Limite anterior do bolo no ângulo posterior do ramo (primeira excursão do osso hioide)	0 = Cabeça do bolo no ângulo posterior do ramo (primeira excursão do hioide)
1 = Limite anterior do bolo na valécula	1 = Cabeça do bolo na valécula

Chart 1. Continued...

2 = Limite anterior do bolo na superfície posterior da epiglote	2 = Cabeça do bolo na face laríngea da epiglote
3 = Limite anterior do bolo no seio piriforme	3 = Cabeça do bolo no seio piriforme
4 = Iniciação não visível em qualquer local	4 = Não há iniciação visível em nenhuma localização
Deficiência faríngea	Alteração faríngea
Componente 7 – Elevação de palato mole	Componente 7 – Elevação do palato mole
Julgue durante a máxima excursão do palato mole.	Avalie durante o deslocamento máximo do palato mole.
0 = Sem bolo entre palato mole (PM)/parede faríngea posterior (PF)	0 = Ausência de bolo entre o palato mole (PM) e a parede faríngea (PF)
1 = Traço de coluna de contraste ou ar entre PM e PF	1 = Vestígio de coluna de contraste ou de ar entre o PM e a PF
2 = Escape para nasofaringe	2 = Escape para a nasofaringe
3 = Escape para cavidade nasal	3 = Escape para a cavidade nasal
4 = Escape para narina com ou sem saída alimentar	4 = Escape para o vestíbulo nasal com ou sem rinorreia
Componente 8 – Elevação laríngea	Componente 8 – Elevação da laringe
Julgue com a epiglote na sua posição mais horizontal.	Avalie quando a epiglote estiver na posição mais horizontal.
0 = Movimento superior completo da cartilagem tireoide com completa aproximação de aritenoides de petíolo de epiglote	0 = Movimento superior completo da cartilagem tireoide com aproximação completa das aritenoides ao pecíolo da epiglote
1 = Movimento superior parcial da cartilagem tireoide / aproximação parcial da aritenóide do petíolo da epiglote	1 = Movimento superior parcial da cartilagem tireoide/ aproximação parcial das aritenoides ao pecíolo da epiglote
2 = Movimento superior mínimo da cartilagem tireoide com mínima aproximação da aritenóide ao petíolo da epiglote	2 = Movimento superior mínimo da cartilagem tireoide com aproximação mínima das cartilagens aritenóideas ao pecíolo da epiglote
3 = Sem movimento superior da cartilagem tireoide	3 = Ausência de movimento superior da cartilagem tireoide
Componente 9 – Excursão anterior do hioide	Componente 9 – Excursão anterior do hioide
Julgue no auge da deglutição ou máximo deslocamento anterior do hioide.	Avalie durante o deslocamento anterior máximo do hioide.
0 = Movimento anterior completo	0 = Movimento anterior completo
1 = Movimento parcial anterior	1 = Movimento anterior parcial
2 = Sem movimento anterior	2 = Ausência de movimento anterior
Componente 10 – Movimento epiglótico	Componente 10 – Movimento da epiglote
Julgue no auge da deglutição ou máximo deslocamento anterior do hioide.	Avalie durante o ponto máximo da deglutição/no deslocamento anterior máximo do hioide.
0 = Completa inversão	0 = Inversão completa
1 = Inversão parcial	1 = Inversão parcial
2 = Sem inversão	2 = Ausência de inversão
Componente 11 – Fechamento do vestíbulo laríngeo	Componente 11 – Fechamento do vestíbulo laríngeo
Julgue no auge da deglutição ou máximo deslocamento anterior do hioide.	Avalie durante o ponto máximo da deglutição/ no deslocamento anterior máximo do hioide.
0 = Completo; sem ar / contraste no vestíbulo laríngeo	0 = Completo; ausência de ar ou contraste no vestíbulo laríngeo
1 = Incompleto; coluna de ar / contraste estreita em vestíbulo laríngeo	1 = Incompleto; fina coluna de ar ou contraste no vestíbulo laríngeo
2 = Sem fechamento; coluna de ar/contraste ampla no vestíbulo laríngeo	2 = Nenhum; ampla coluna de ar ou contraste no vestíbulo laríngeo
Componente 12 – Onda faríngea uniforme	Componente 12 – Onda de decapagem faríngea
Julgue durante toda a duração da fase faríngea.	Avalie durante a duração completa da deglutição faríngea.
0 = Presente - completa	0 = Presente- completa
1 = Presente - diminuída	1 = Presente- diminuída
2 = Ausente	2 = Ausente
Componente 13 – Contração faríngea	Componente 13 – Contração faríngea
Julgue na visão anteroposterior em repouso e durante o máximo movimento das estruturas.	Avalie na projeção anteroposterior no repouso e durante todo o movimento máximo das estruturas.

Chart 1. Continued...

0 = Completo	0 = Completa
1 = Incompleto (pseudodivertículo)	1 = Incompleta (pseudodivertículo)
2 = Abaulamento unilateral	2 = Abaulamento unilateral
3 = Abaulamento bilateral	3 = Abaulamento bilateral
Componente 14 – Abertura do segmento faringo-esofágico (SFE)	Componente 14 – Abertura do segmento faringo-esofágico
Julgue durante a máxima distensão do SFE e durante sua abertura e fechamento.	Avalie durante a distensão máxima do EES ao longo da abertura e fechamento.
0 = Distensão completa e duração completa; sem obstrução do fluxo	0 = Distensão e duração completas; sem obstrução do fluxo
1 = Distensão parcial / duração parcial; obstrução parcial do fluxo	1 = Distensão parcial/ duração parcial; obstrução parcial do fluxo
2 = Distensão mínima/ mínima duração; obstrução pronunciada do fluxo	2 = Distensão mínima/ duração mínima; acentuada obstrução do fluxo
3 = Sem distensão com total obstrução do fluxo	3 = Ausência de distensão com obstrução total do fluxo
Componente 15 – Retração de base de língua (BL)	Componente 15 – Retração da base da língua (BL)
Julgue durante a máxima retração da base de língua	Avalie durante a retração máxima da base da língua.
0 = Sem contraste entre BL e parede faríngea posterior (PF)	0 = Ausência de contraste entre a BL e a parede posterior da faringe (PPF)
1 = Traço de coluna de contraste ou ar entre BL e PF	1 = Vestígio de coluna de contraste ou de ar entre BL e PPF
2 = Coluna de contraste ou ar estreita entre BL e PF	2 = Fina coluna de contraste ou de ar entre BL e PPF
3 = Coluna de contraste ou ar ampla entre BL e PF	3 = Ampla coluna de contraste ou de ar entre BL e PPF
4 = Sem mobilidade posterior visível da BL	4 = Ausência de movimento posterior da BL
Componente 16 – Resíduo faríngeo	Componente 16 – Resíduo faríngeo
Julgue após a primeira deglutição ou após a última deglutição na sequência de exercícios de deglutição	Avalie depois da primeira deglutição ou depois da última deglutição de uma sequência de deglutições.
0 = Completo clareamento faríngeo	0 = Clareamento faríngeo completo
1 = Traço de resíduo em meio ou sobre estruturas faríngeas	1 = Vestígios de resíduos dentro ou sobre as estruturas faríngeas
2 = Coleção de resíduo em meio ou sobre estruturas faríngeas	2 = Coleção de resíduos dentro ou sobre as estruturas faríngeas
3 = Maioria do contraste em meio ou sobre estruturas faríngeas	3 = Maior parte do contraste dentro ou sobre as estruturas faríngeas
4 = Sem ou mínimo clareamento faríngeo	4 = Clareamento faríngeo mínimo ou ausente
Local A = Base de língua B = Valécua C = Parede faríngea D = Pregas ariepiglóticas E = Seios piriformes F = Difuso (> 3 áreas)	Localização A= Base da língua B = Pregas ariepiglóticas C = Valéculas D = Seios piriformes E = Parede faríngea F = Difuso (>3 áreas)
Deficiência esofágica	Alteração esofágica
Componente 17 – Clareamento esofágico posição em pé	Componente 17 – Clareamento esofágico em posição ortostática
Julgue em visão anteroposterior durante trânsito do bolo da cavidade oral ao segmento esofágico inferior (SEI)	Avalie em visão anteroposterior durante o trânsito do bolo da cavidade oral até o segmento esofágico inferior (SEI)
0 = Clareamento completo; revestimento esofágico	0 = Limpeza completa; revestimento esofágico
1 = Retenção esofágica	1 = Retenção esofágica
2 = Retenção esofágica com fluxo retrógrado abaixo do segmento faringo-esofágico (SFE)	2 = Retenção esofágica com fluxo retrógrado abaixo do segmento faringo-esofágico (SFE)
3 = Retenção esofágica com fluxo retrógrado através do SFE	3 = Retenção esofágica com fluxo retrógrado através do SFE
4 = Clareamento mínimo ou ausente	4 = Limpeza mínima ou ausente
Brazilian Portuguese Synthesized Version (BPSV)	Final Brazilian Portuguese Version (FBPV)
ESCALA MARTIN-HARRIS PARA VIDEOFLUOROSCOPIA DA DEGLUTIÇÃO – MBSImP™	ESCALA MARTIN-HARRIS PARA VIDEOFLUOROSCOPIA DA DEGLUTIÇÃO – MBSImP™
Componentes, Pontuação e Definição de pontuação.	Componentes, Pontuação e Definição de pontuação.
Alteração oral	Alteração oral
Componente 1 – Vedamento labial	Componente 1 – Vedamento labial
Avalie em qualquer momento da deglutição.	Julgue em qualquer momento da deglutição.
0 = Ausência de escape labial	0 = Ausência de escape labial
1 = Escape interlabial; sem progressão para o lábio anterior	1 = Escape interlabial; sem progressão para o lábio anterior
2 = Escape pelo espaço interlabial ou comissura labial; sem extensão além da borda do vermelhão dos lábios	2 = Escape pelo espaço interlabial ou comissura labial; sem extensão além da borda do vermelhão dos lábios
3 = Escape progredindo para o meio do queixo	3 = Escape progredindo para o meio do queixo
4 = Escape além do meio do queixo	4 = Escape além do meio do queixo
Componente 2 – Controle lingual do bolo alimentar	Componente 2 – Controle lingual do bolo alimentar
Avalie apenas durante a contenção de bolo líquido e antes dos movimentos efetivos de língua.	Julgue apenas na contenção do bolo líquido e antes dos movimentos produtivos da língua.
0 = Bolo contido entre a língua e o fechamento palatal	0 = Bolo contido entre a língua e o fechamento palatal

Chart 1. Continued...

1 = Escape para a cavidade bucal lateral/assoalho de boca	1 = Escape para a cavidade bucal lateral/assoalho de boca
2 = Escape posterior menor do que a metade do bolo	2 = Escape posterior menor do que a metade do bolo
3 = Escape posterior maior do que a metade do bolo	3 = Escape posterior maior do que a metade do bolo
Componente 3 – Preparação / mastigação do bolo	Componente 3 – Preparação / mastigação do bolo
Avalie apenas durante a oferta de meio biscoito seco revestido com pudim.	Julgue apenas durante a oferta de meio biscoito seco revestido com pudim.
0 = Mastigação e trituração eficientes e com duração apropriada	0 = Mastigação e trituração eficientes e com duração apropriada
1= Mastigação/trituração lenta e prolongada, com recoleção completa do bolo	1= Mastigação/trituração lenta e prolongada, com reunião completa do bolo
2 = Mastigação/trituração desorganizada, com pedaços sólidos não mastigados	2 = Mastigação/trituração desorganizada, com pedaços sólidos não mastigados
3 = Mastigação/trituração mínima, com a maioria do bolo não mastigado	3 = Mastigação/trituração mínima, com a maioria do bolo não mastigado
Componente 4 – Transporte do bolo/movimento lingual	Componente 4 – Transporte do bolo/movimento lingual
Avalie após o primeiro movimento produtivo de língua para o transporte de bolo na cavidade oral.	Julgue após o primeiro movimento produtivo de língua para o transporte de bolo na cavidade oral.
0 = Movimento de língua vigoroso	0 = Movimento de língua vigoroso
1 = Movimento de língua com início tardio	1 = Movimento de língua com início tardio
2 = Movimento de língua lento	2 = Movimento de língua lento
3 = Movimento de língua repetitivo ou desorganizado	3 = Movimento de língua repetitivo ou desorganizado
4 = Movimento de língua mínimo ou ausente	4 = Movimento de língua mínimo ou ausente
Componente 5 – Resíduo oral	Componente 5 – Resíduo oral
Avalie após a primeira deglutição ou após a última deglutição no caso de deglutições sequenciais	Julgue após a primeira deglutição ou após a última deglutição nas tarefas de deglutições sequenciais.
0 = Ausência de resíduo oral	0 = Ausência de resíduo oral
1 = Traços de resíduos revestindo as estruturas orais	1 = Traços de resíduos revestindo as estruturas orais
2 = Coleção de resíduos do bolo nas estruturas orais	2 = Coleção de resíduos do bolo nas estruturas orais
3 = Permanência da maioria do bolo	3 = Permanência da maioria do bolo
4 = Limpeza mínima ou ausente	4 = Limpeza mínima ou ausente
Local: A = Assoalho da boca B = Palato C = Língua D = Sulco lateral	Local: A = Assoalho da boca B = Palato C = Língua D = Sulco lateral
Componente 6 – Iniciação da fase faríngea da deglutição	Componente 6 – Início da fase faríngea da deglutição
Avalie durante o primeiro movimento vigoroso de deslocamento anterossuperior do osso hioide.	Julgue durante o primeiro movimento vigoroso de deslocamento anterossuperior do osso hioide.
0 = Cabeça do bolo no ângulo posterior do ramo da mandíbula (primeira excursão do osso hioide)	0 = Cabeça do bolo no ângulo posterior do ramo da mandíbula (primeira excursão do osso hioide)
1 = Limite anterior do bolo nas valéculas	1 = Cabeça do bolo nas valéculas
2 = Limite anterior do bolo (cabeça) na face laríngea da epiglote	2 = Cabeça do bolo na face laríngea da epiglote
3 = Limite anterior do bolo (cabeça) no seio piriforme	3 = Cabeça do bolo no seio piriforme
4 = Iniciação não visível em nenhum local	4 = Nenhum início visível em qualquer local
Alteração faríngea	Alteração faríngea
Componente 7 – Elevação do palato mole	Componente 7 – Elevação do palato mole
Avalie durante o deslocamento máximo do palato mole.	Julgue durante o deslocamento máximo do palato mole.
0 = Ausência de bolo entre o palato mole (PM) e a parede faríngea (PF)	0 = Ausência de bolo entre o palato mole (PM)/parede faríngea (PF)
1 = Vestígio de coluna de contraste ou de ar entre o PM e a PF	1 = Coluna com traço de contraste ou ar entre PM e PF
2 = Escape para a nasofaringe	3 = Escape para nasofaringe
3 = Escape para a cavidade nasal	3 = Escape para a cavidade nasal
4 = Escape para o vestíbulo nasal com ou sem rinorreia	4 = Escape para a narina com ou sem saída alimentar
Componente 8 – Elevação da laringe	Componente 8 – Elevação laríngea
Avalie quando a epiglote estiver na posição mais horizontal.	Julgue quando a epiglote estiver na sua posição mais horizontal.
0 = Movimento superior completo da cartilagem tireoidea com aproximação completa das aritenoides ao peçolo da epiglote	0 = Movimento superior completo da cartilagem tireoide com completa aproximação das aritenoides ao peçolo da epiglote
1 = Movimento superior parcial da cartilagem tireoidea/ aproximação parcial das aritenoides ao peçolo da epiglote	1 = Movimento superior parcial da cartilagem tireoide/aproximação parcial das aritenoides ao peçolo da epiglote

Chart 1. Continued...

2 = Movimento superior mínimo da cartilagem tireoide com aproximação mínima das cartilagens aritenoides ao pecíolo da epiglote	2 = Movimento superior mínimo da cartilagem tireoide com mínima aproximação das aritenoides ao pecíolo da epiglote
3 = Ausência de movimento superior da cartilagem tireoide	3 = Ausência de movimento superior da cartilagem tireoide
Componente 9 – Excursão anterior do hioide	Componente 9 – Excursão anterior do hioide
Avalie durante o deslocamento anterior máximo do hioide.	Julgue no auge da deglutição ou no máximo deslocamento anterior do hioide.
0 = Movimento anterior completo	0 = Movimento anterior completo
1 = Movimento anterior parcial	1 = Movimento anterior parcial
2 = Ausência de movimento anterior	2 = Ausência de movimento anterior
Componente 10 – Movimento da epiglote	Componente 10 – Movimento epiglótico
Avalie durante o ponto máximo da deglutição/no deslocamento anterior máximo do hioide.	Julgue no auge da deglutição ou no máximo deslocamento anterior do hioide.
0 = Inversão completa	0 = Inversão completa
1 = Inversão parcial	1 = Inversão parcial
2 = Ausência de inversão	2 = Ausência de inversão
Componente 11 – Fechamento do vestíbulo laríngeo	Componente 11 – Fechamento do vestíbulo laríngeo
Avalie durante o ponto máximo da deglutição/ no deslocamento anterior máximo do hioide.	Julgue no auge da deglutição ou no máximo deslocamento anterior do hioide.
0 = Completo; ausência de ar ou contraste no vestíbulo laríngeo	0 = Completo; ausência de ar/contraste no vestíbulo laríngeo
1 = Incompleto; fina coluna de ar ou contraste no vestíbulo laríngeo	1 = Incompleto; estreita coluna de ar/contraste no vestíbulo laríngeo
2 = Nenhum; ampla coluna de ar ou contraste no vestíbulo laríngeo	2 = Ausente; ampla coluna de ar/contraste no vestíbulo laríngeo
Componente 12 – Onda de decapagem faríngea	Componente 12 – Onda de limpeza faríngea
Avalie durante a duração completa da deglutição faríngea.	Julgue durante toda a duração da fase faríngea.
0 = Presente- completa	0 = Presente - completa
1 = Presente- diminuída	1 = Presente - diminuída
2 = Ausente	2 = Ausente
Componente 13 – Contração faríngea	Componente 13 – Contração faríngea
Avalie na projeção anteroposterior no repouso e durante todo o movimento máximo das estruturas.	Julgue na visão anteroposterior em repouso e durante o máximo movimento das estruturas.
0 = Completa	0 = Completo
1 = Incompleta (pseudodivertículo)	1 = Incompleto (pseudodivertículo)
2 = Abaulamento unilateral	2 = Abaulamento unilateral
3 = Abaulamento bilateral	3 = Abaulamento bilateral
Componente 14 – Abertura do segmento faringo-esofágico	Componente 14 – Abertura do segmento faringo-esofágico (SFE)
Avalie durante a distensão máxima do EES ao longo da abertura e fechamento.	Julgue durante a máxima distensão do SFE e durante sua abertura e fechamento.
0 = Distensão e duração completas; sem obstrução do fluxo	0 = Distensão/duração completas; sem obstrução do fluxo
1 = Distensão parcial/ duração parcial; obstrução parcial do fluxo	1 = Distensão/duração parciais; obstrução parcial do fluxo
2 = Distensão mínima/duração mínima; acentuada obstrução do fluxo	2 = Distensão/duração mínimas; obstrução acentuada do fluxo
3 = Ausência de distensão com obstrução total do fluxo	3 = Ausência de distensão com total obstrução do fluxo
Componente 15 – Retração da base da língua (BL)	Componente 15 – Retração da base de língua (BL)
Avalie durante a retração máxima da base da língua.	Julgue durante a máxima retração da base de língua.
0 = Ausência de contraste entre a BL e a parede posterior da faringe (PPF)	0 = Ausência de contraste entre BL e parede faríngea (PF)
1 = Vestígio de coluna de contraste ou de ar entre BL e PPF	1 = Traço de contraste ou ar entre BL e PF
2 = Fina coluna de contraste ou de ar entre BL e PPF	2 = Estreita coluna de contraste entre BL e PF
3 = Ampla coluna de contraste ou de ar entre BL e PPF	3 = Ampla coluna de contraste ou ar entre BL e PF

Chart 1. Continued...

4 = Ausência de movimento posterior da BL	4 = Ausência de mobilidade posterior visível da BL
Componente 16 – Resíduo faríngeo	Componente 16 – Resíduo faríngeo
Avalie depois da primeira deglutição ou depois da última deglutição de uma sequência de deglutições.	Julgue após a primeira deglutição ou após a última deglutição no caso de deglutições sequenciais.
0 = Clareamento faríngeo completo	0 = Limpeza faríngea completa
1 = Vestígios de resíduos dentro ou sobre as estruturas faríngeas	1 = Traço de resíduo dentro ou sobre as estruturas faríngeas
2 = Coleção de resíduos dentro ou sobre as estruturas faríngeas	2 = Coleção de resíduos dentro ou sobre as estruturas faríngeas
3 = Maior parte do contraste dentro ou sobre as estruturas faríngeas	3 = Maioria do contraste dentro ou sobre as estruturas faríngeas
4 = Clareamento faríngeo mínimo ou ausente	4 = Ausência ou limpeza faríngea mínima
Localização: A = Base da Língua B = Valéculas C = Parede faríngea D = Pregas ariepiglóticas E = Seios piriformes F = Difuso (>3 áreas)	Local: A = Base da Língua B = Valéculas C = Parede faríngea D = Pregas ariepiglóticas E = Seios piriformes F = Difuso (>3 áreas)
Alteração esofágica	Alteração esofágica
Componente 17 – Clareamento esofágico em posição ortostática	Componente 17 – Clareamento esofágico em posição ortostática
Avalie em visão anteroposterior durante o trânsito do bolo da cavidade oral até o segmento esofágico inferior (SEI).	Julgue em visão anteroposterior durante o trânsito do bolo da cavidade oral até o segmento esofágico inferior (SEI).
0 = Limpeza completa; esvaziamento esofágico	0 = Limpeza completa; revestimento esofágico
1 = Retenção esofágica	1 = Retenção esofágica
2 = Retenção esofágica com fluxo retrógrado abaixo do seguimento faringo-esofágico (SFE)	2 = Retenção esofágica com fluxo retrógrado abaixo do seguimento faringo-esofágico (SFE)
3 = Retenção esofágica com fluxo retrógrado através do SFE	3 = Retenção esofágica com fluxo retrógrado através do SFE
4 = Limpeza mínima ou ausente	4 = Limpeza mínima ou ausente

Chart 2. Back translations (BT1, BT2), original MBSImP protocol and final back translated version (BTV)

BT1 – MARTIN-HARRIS SCALE FOR SWALLOWING VIDEOSWALLOWING - MBSImP™	BT2 – MARTIN-HARRIS SCALE FOR VIDEOSWALLOWING OF SWALLOWING - MBSImP™
Components, Scoring and Scoring System	Components, Score and Definition of Score
Oral Alteration	Oral Alteration
Component 1 – Lip Closure	Component 1 – Lip Sealing
Evaluate at any moment of swallowing.	Evaluate at any time during swallowing.
0 = No labial escape	0 = Absence of labial leakage
1 = Interlabial escape; no progression to the anterior lip	1 = Interlabial leakage; no progression to the anterior lip
2 = Escape from interlabial space or lateral junction; no extension beyond the vermilion border of the lips	2 = Leakage through the interlabial space or lip commissure; no extension beyond the edge of the lip vermilion
3 = Escape progressing to the mid-chin	3 = Leakage progressing to the middle of the chin
4 = Escape beyond the mid-chin	4 = Leakage beyond the middle of the chin
Component 2 – Tongue Control During Bolus Hold	Component 2 – Lingual Bolus Control
Evaluate on the held liquid bolus only and prior effective tongue movements.	Evaluate only during liquid bolus containment and before effective tongue movements.
0 = Bolus between tongue and palatal seal	0 = Bolus contained between the tongue and palatal closure
1 = Escape to the lateral buccal cavity/mouth floor	1 = Leakage for side oral cavity / mouth floor
2 = Posterior escape of less than half of the bolus	2 = Posterior leakage smaller than half of the bolus
3 = Posterior escape of greater than half of the bolus	3 = Posterior leakage larger than half of the bolus
Component 3 – Bolus Preparation/ Mastication	Component 3 – Bolus Preparation / Chewing
Evaluate only when offering half a dry cookie coated with pudding.	Evaluate only when offering half pudding-coated dry cookie.
0 = Timely and efficient chewing and mashing	0 = Efficient chewing and crushing of appropriate duration
1 = Slow and prolonged chewing/mashing with complete recollection of the bolus	1 = Slow and prolonged chewing/crushing, with complete recollection of the bolus
2 = Disorganized chewing/mashing with solid pieces of bolus unchewed	2 = Disorganized chewing/crushing with solid unchewed pieces
3 = Minimal chewing/mashing, with majority of bolus unchewed	3 = Minimal chewing/crushing, with most of the bolus not chewed

Chart 2. Continued...

Component 4 – Bolus Transport / Lingual Motion	Component 4 – Bolus Transport / Lingual Movement
Evaluate after first productive tongue movement for bolus transport in the oral cavity.	Evaluate after the first productive tongue movement for the transport of bolus in the oral cavity.
0 = Brisk tongue motion	0 = Vigorous tongue movement
1 = Delayed initiation of tongue motion	1 = Delayed initiation of tongue movement
2 = Slow tongue motion	2 = Slow tongue movement
3 = Repetitive or disorganized tongue motion	3 = Repetitive or disorganized tongue movement
4 = Minimal to no tongue motion	4 = Minimum or no tongue movement
Component 5 – Oral Residue	Component 5 – Oral Residue
Evaluate after first swallow or after last swallow in case of sequential swallows.	Evaluate after the first swallowing or after the last swallowing in the case of sequential swallowing.
0 = Complete oral clearance	0 = Absence of oral residue
1 = Trace residue lining oral structures	1 = Traces of residue coating oral structures
2 = Bolus Residue collection on oral structures	2 = Collection of bolus residues in oral structures
3 = Majority of bolus remaining	3 = Permanence of the majority of the bolus
4 = Minimal to no clearance	4 = Minimal or absent cleaning
Local A = Floor of the Mouth B = Palate C = Tongue D = Lateral sulci	Location: A = Mouth floor B = Palate C = Tongue D = Lateral sulcus
Component 6 – Initiation of Pharyngeal Swallow Phase	Component 6 – Initiation of the Pharyngeal Phase of Swallowing
Evaluate at the first movement of the brisk superior-anterior hyoid trajectory.	Evaluate during the first vigorous anterosuperior displacement movement of the hyoid bone.
0 = Bolus head at posterior angle of mandible ramus (first hyoid excursion)	0 = Bolus head at the posterior angle of the mandibular branch (first hyoid bone excursion).
1 = Oral cavity of the bolus in the valleculae	1 = Oral cavity of the bolus in the valleculae
2 = Oral cavity of the bolus (head) at the laryngeal surface of the epiglottis	2 = Oral cavity of the (head) bolus on the laryngeal surface of the epiglottis
3 = Oral cavity of the bolus (head) in the pyriform sinus	3 = Oral cavity of the (head) bolus in the pyriform sinus
4 = No visible initiation in any location	4 = Initiation not visible in any location
Pharyngeal Alteration	Pharyngeal Alteration
Component 7 – Soft Palate Elevation	Component 7 – Elevation of the Soft Palate
Evaluate during maximum displacement of the soft palate.	Evaluate during the maximum displacement of the soft palate.
0 = No bolus between soft palate (SP) / pharyngeal wall (PW)	0 = Absence of bolus between soft palate (SP) / pharyngeal wall (PW)
1 = Trace of contrast or air between SP and PW	1 = Trace of contrast or air between SP and PW
3 = Escape to nasopharynx	3 = Leakage into the nasopharynx
3 = Escape to nasal cavity	3 = Leakage into the nasal cavity
4 = Escape to nostril with or without escape of food	4 = Leakage into the nostril with or without escape of food.
Component 8 – Laryngeal Elevation	Component 8 – Laryngeal Elevation
Evaluate when the epiglottis is in its most horizontal position.	Evaluate when the epiglottis is in its most horizontal position
0 = Complete superior movement of thyroid cartilage with complete approximation of arytenoids to epiglottic petiole	0 = Full superior movement of thyroid cartilage with complete approximation of the arytenoids to the petiole of the epiglottis
1 = Partial superior movement of thyroid cartilage / partial approximation of arytenoids to epiglottic petiole	1 = Partial superior movement of thyroid cartilage / partial approximation of the arytenoids to the petiole of the epiglottis
2 = Minimal superior movement of thyroid cartilage with minimal approximation of arytenoids to epiglottic petiole	2 = Minimum superior movement of thyroid cartilage with minimum approximation of the arytenoids to the petiole of the epiglottis
3 = No superior movement of thyroid cartilage	3 = Absence of superior movement of thyroid cartilage
Component 9 – Previous Hyoid Excursion	Component 9 – Previous Hyoid Excursion
Evaluate at the height of swallow or at the maximum anterior displacement of the hyoid.	Evaluate at the peak of swallowing or maximum anterior displacement of the hyoid.
0 = Complete anterior movement	0 = Full anterior movement
1 = Partial anterior movement	1 = Partial anterior movement
2 = No anterior movement	2 = Absence of anterior movement

Chart 2. Continued...

Component 10 – Epiglottic Movement	Component 10 – Epiglottic Movement
Evaluate at the height of swallow or at the maximum anterior displacement of the hyoid.	Evaluate at the peak of swallowing or maximum anterior displacement of the hyoid.
0 = Complete inversion	0 = Complete reversal
1 = Partial inversion	1 = Partial reversal
2 = No inversion	2 = Absence of reversal
Component 11 – Laryngeal Vestibule Closure	Component 11 – Closure of the Laryngeal Vestibule
Evaluate at the height of swallow or at the maximal anterior displacement of the hyoid.	Evaluate at the peak of swallowing or maximum anterior displacement of the hyoid.
0 = Complete; absence of air / contrast in the laryngeal vestibule	0 = Complete; absence of air / contrast in the laryngeal vestibule
1 = Incomplete; air column / narrow contrast in the laryngeal vestibule	1 = Incomplete; narrow column of air / contrast in the laryngeal vestibule
2 = Absent; air column / wide contrast in the laryngeal vestibule	2 = Absent; wide column of air / contrast in the laryngeal vestibule
Component 12 – Pharyngeal Stripping Wave	Component 12 – Pharyngeal Clearing Wave
Evaluate during the full duration of pharyngeal phase.	Evaluate for the entire duration of pharyngeal phase.
0 = Present – complete	0 = Present – complete
1 = Present – diminished	1 = Present – diminished
2 = Absent	2 = Absent
Component 13 – Pharyngeal Contraction	Component 13 – Pharyngeal Contraction
Evaluate at anteroposterior view at rest and throughout maximum movement of structures.	Evaluate the anteroposterior view at rest and during the maximum movement of the structures.
0 = Complete	0 = Complete
1 = Incomplete (pseudodiverticulum)	1 = Incomplete (pseudodiverticulum)
2 = Unilateral bulging	2 = Unilateral bulging
3 = Bilateral bulging	3 = Bilateral bulging
Component 14 – Pharyngoesophageal Segment Opening (PES)	Component 14 – Opening of the Pharyngoesophageal Segment (PES)
Evaluate during maximum distention of PES and throughout opening and closing.	Evaluate during maximum PES distention and during its opening and closing.
0 = Complete distension and duration; no flow obstruction	0 = Complete distension and duration; no flow obstruction
1 = Partial distension / duration; partial flow obstruction	1 = Partial distension / duration; partial flow obstruction
2 = Minimal distension / duration; marked flow obstruction	2 = Minimal distension/duration; accentuated flow obstruction
3 = No distension with total flow obstruction	3 = Absence of distension with total flow obstruction
Component 15 – Tongue Base Retraction (TB)	Component 15 – Retraction of the Tongue Base (TB)
Evaluate during maximum retraction of the tongue base.	Evaluate during the maximum retraction of tongue base.
0 = No contrast between TB and pharyngeal wall (PW)	0 = Absence of contrast between TB and pharyngeal wall (PW)
1 = Trace contrast or air between TB and PW	1 = Trace of contrast or air between TB and PW
2 = Narrow column of contrast between TB and PW	2 = Narrow contrast column between TB and PW
3 = Wide column of contrast or air between TB and PW	3 = Wide column of contrast or air between TB and PW
4 = No visible posterior motion of TB	4 = Absence of visible posterior TB mobility
Component 16 – Pharyngeal Residue	Component 16 – Pharyngeal Residue
Evaluate after first swallow or after last swallow in case of sequential swallows.	Evaluate after the first swallowing or after the last swallowing in the case of sequential swallowing.
0 = Complete pharyngeal clearance	0 = Complete pharyngeal cleaning
1 = Trace residue within or on pharyngeal structures	1 = Trace of residue within or on pharyngeal structures
2 = Collection of residue within or on pharyngeal structures	2 = Collection of residues within or on pharyngeal structures
3 = Majority of contrast within or on pharyngeal structures	3 = Majority of contrast within or on pharyngeal structures
4 = Minimal to no pharyngeal clearance	4 = Absence or minimum pharyngeal cleaning
Local: A = Tongue base B = Valleculas C = Pharyngeal wall D = Aryepiglottic folds E = Piriform Sinus F = Diffuse (> 3 areas).	Location: A = Tongue base B = Valleculae C = Pharyngeal wall D = Aryepiglottic folds E = Piriform sinuses F = Diffuse (> 3 areas)

Chart 2. Continued...

Esophageal Alteration	Esophageal Alteration
Component 17 – Esophageal Clearance in an Upright Position	Component 17 – Esophageal Clearance in Upright (“Orthostatic”) Position
Evaluate in anteroposterior view during the bolus transit through the oral cavity to lower esophageal segment (LES)	Evaluate in anteroposterior view during the transit of the bolus from the oral cavity to the lower esophageal segment (LES).
0 = Complete clearance; esophageal coating	0 = Complete clearance; esophageal emptying
1 = Esophageal retention	1 = Esophageal retention
2 = Esophageal retention with retrograde flow below pharyngoesophageal segment (PES)	2 = Esophageal retention with retrograde flow below pharyngoesophageal segment (PES)
3 = Esophageal retention with retrograde flow through PES	3 = Esophageal retention with retrograde flow through the PES
4 = Minimal to no clearance	4 = Minimal or absent clearance
Original MBSImP Protocol	Final Back Translated Version (BTV)
THE MODIFIED BARIUM SWALLOW IMPAIRMENT PROFILE: MBSImPTM©	MARTIN-HARRIS SCALE FOR VIDEOFUOROSCOPY OF SWALLOWING – MBSImP™©
Components, Scores and Score Definitions	Components, Scores and Definitions of Scores
Oral Impairment	Oral Alteration
Component 1 – Lip Closure	Component 1 – Lip Closure
Judge at any point during the swallow.	Judge at any time of swallowing.
0 = No labial escape	0 = No labial escape
1 = Interlabial escape; no progression to anterior lip	1 = Interlabial escape; no progression to the anterior lip
2 = Escape from interlabial space or lateral juncture; no extension beyond vermilion border	2 = Escape from interlabial space or lip commissure; no extension beyond the vermilion border of the lower lips
3 = Escape progressing to mid-chin	3 = Escape progressing to the mid-chin
4 = Escape beyond mid-chin	4 = Escape beyond the mid-chin
Component 2 – Tongue Control During Bolus Hold	Component 2 – Tongue Control During Bolus Hold
Judge on held liquid boluses only and prior to productive tongue movement.	Judge on held liquid boluses only and prior to productive tongue movement.
0 = Cohesive bolus between tongue to palatal seal	0 = Bolus contained between the tongue and palatal seal
1 = Escape to lateral buccal cavity/floor of mouth (FOM)	1 = Escape to the lateral buccal cavity/mouth floor
2 = Posterior escape of less than half of bolus	2 = Posterior escape of less than half of the bolus
3 = Posterior escape of greater than half of bolus	3 = Posterior escape of greater than half of the bolus
Component 3 – Bolus Preparation/ mastication	Component 3 – Bolus Preparation / mastication
Judge only during presentation of ½ shortbread cookie coated in pudding.	Judge only when offering half a dry cookie coated with pudding.
0 = Timely and efficient chewing and mashing	0 = Timely and efficient chewing and mashing
1 = Slow prolonged chewing/mashing with complete re-collection	1 = Slow and prolonged chewing/mashing with complete recollection of the bolus
2 = Disorganized chewing/mashing with solid pieces of bolus unchewed	2 = Disorganized chewing/mashing with solid pieces of bolus unchewed
3 = Minimal chewing/mashing with majority of bolus unchewed	3 = Minimal chewing/mashing, with majority of bolus unchewed
Component 4 – Bolus Transport / Lingual Motion	Component 4 – Bolus Transport / Lingual Motion
Judge after productive tongue movement for oral bolus transport.	Judge after first productive tongue movement for bolus transport in the oral cavity.
0 = Brisk tongue motion	0 = Brisk tongue motion
1 = Delayed initiation of tongue motion	1 = Delayed initiation of tongue motion
2 = Slowed tongue motion	2 = Slow tongue motion
3 = Repetitive/disorganized tongue motion	3 = Repetitive or disorganized tongue motion
4 = Minimal to no tongue motion	4 = Minimal or no tongue motion
Component 5 – Oral Residue	Component 5 – Oral Residue
Judge after first swallow or after the last swallow of the sequential swallow tasks.	Judge after first swallow or after last swallow in the sequential swallow tasks.
0 = Complete oral clearance	0 = Complete oral clearance
1 = Trace residue lining oral structures	1 = Trace residue lining oral structures
2 = Residue collection on oral structures	2 = Collection of bolus residues in oral structures
3 = Majority of bolus remaining	3 = Majority of bolus remaining
4 = Minimal to no clearance	4 = Minimal or no clearance
Location: A = Floor of Mouth B = palate C = Tongue D= Lateral sulci	Local A = Floor of the mouth B = Palate C = Tongue D = Lateral sulci

Chart 2. Continued...

Component 6 – Initiation of Pharyngeal Swallow	Component 6 – Initiation of Pharyngeal Phase of Swallowing
Judge at first movement of the brisk superior-anterior hyoid trajectory.	Judge at the first movement of the brisk superior-anterior hyoid trajectory.
0 = Bolus head at posterior angle of ramus (first hyoid excursion)	0 = Bolus head at posterior angle of mandible ramus (first hyoid excursion)
1 = Bolus head in valleculae	1 = Bolus head in the valleculae
2 = Bolus head at posterior laryngeal surface of epiglottis	2 = Bolus head at the laryngeal surface of the epiglottis
3 = Bolus head in pyriforms	3 = Bolus head at the pyriform sinus
4 = No visible initiation at any location	4 = No visible initiation at any location
Pharyngeal Impairment	Pharyngeal Alteration
Component 7 – Soft Palate Elevation	Component 7 – Soft Palate Elevation
Judge during maximum displacement of soft palate.	Judge during maximum displacement of the soft palate.
0 = No bolus between soft palate (SP)/pharyngeal wall (PW)	0 = No bolus between soft palate (SP) / pharyngeal wall (PW)
1 = Trace column of contrast or air between SP and PW	1 = Trace column of contrast or air between SP and PW
2 = Escape to nasopharynx	3 = Escape to nasopharynx
3 = Escape to nasal cavity	3 = Escape to nasal cavity
4 = Escape to nostril with/without emission	4 = Escape to nostril with or without escape of food
Component 8 – Laryngeal Elevation	Component 8 – Laryngeal Elevation
Judge when epiglottis is in its most horizontal position.	Judge when the epiglottis is in its most horizontal position.
0 = Complete superior movement of thyroid cartilage with complete approximation of arytenoids to epiglottic petiole	0 = Complete superior movement of thyroid cartilage with complete approximation of arytenoids to epiglottic petiole
1 = Partial superior movement of thyroid cartilage/partial approximation of arytenoids to epiglottic petiole	1 = Partial superior movement of thyroid cartilage / partial approximation of arytenoids to epiglottic petiole
2 = Minimal superior movement of thyroid cartilage with minimal approximation of arytenoids to epiglottic petiole	2 = Minimal superior movement of thyroid cartilage with minimal approximation of arytenoids to epiglottic petiole
3 = No superior movement of thyroid cartilage	3 = No superior movement of thyroid cartilage
Component 9 – Anterior Hyoid Excursion	Component 9 – Anterior Hyoid Excursion
Judge at height of swallow/maximal anterior hyoid displacement.	Judge at the height of swallow or at the maximum anterior displacement of the hyoid.
0 = Complete anterior movement	0 = Complete anterior movement
1 = Partial anterior movement	1 = Partial anterior movement
2 = No anterior movement	2 = No anterior movement
Component 10 – Epiglottic Movement	Component 10 – Epiglottic Movement
Judge at height of swallow/maximal anterior hyoid displacement.	Judge at the height of swallow or at the maximum anterior displacement of the hyoid.
0 = Complete inversion	0 = Complete inversion
1 = Partial inversion	1 = Partial inversion
2 = No inversion	2 = No inversion
Component 11 – Laryngeal Vestibular Closure	Component 11 – Laryngeal Vestibule Closure
Judge at height of swallow/maximal anterior hyoid displacement.	Judge at the height of swallow or at the maximal anterior displacement of the hyoid.
0 = Complete; no air/contrast in laryngeal vestibule	0 = Complete; absence of air / contrast in the laryngeal vestibule
1 = Incomplete; narrow column air/contrast in laryngeal vestibule	1 = Incomplete; narrow column of air/contrast in the laryngeal vestibule
2 = None; wide column air/contrast in laryngeal vestibule	2 = Absent; wide column of air/contrast in the laryngeal vestibule
Component 12 – Pharyngeal Stripping Wave	Component 12 – Pharyngeal Stripping Wave
Judge during the full duration of the pharyngeal swallow.	Judge during full duration of the pharyngeal phase.
0 = Present – complete	0 = Present – complete
1 = Present – diminished	1 = Present – diminished
2 = Absent	2 = Absent

Chart 2. Continued...

Component 13 – Pharyngeal Contraction	Component 13 – Pharyngeal Contraction
Judge in AP view at rest and throughout maximum movement of structure.	Judge at anteroposterior view at rest and during maximum movement of structures.
0 = Complete	0 = Complete
1 = Incomplete (pseudodiverticulae)	1 = Incomplete (pseudodiverticulum)
2 = Unilateral bulging	2 = Unilateral bulging
3 = Bilateral bulging	3 = Bilateral bulging
Component 14 – Pharyngoesophageal Segment Opening	Component 14 – Pharyngoesophageal Segment Opening (PES)
Judge during maximum distension of PES and throughout opening and closure.	Judge during maximum distention of PES and throughout opening and closing.
0 = Complete distension and complete duration; no obstruction of flow	0 = Complete distension and duration; no flow obstruction
1 = Partial distension/partial duration; partial obstruction of flow	1 = Partial distension/duration; partial flow obstruction
2 = Minimal distension/minimal duration; marked obstruction of flow	2 = Minimal distension/duration; marked flow obstruction
3 = No distension with total obstruction of flow	3 = No distension with total flow obstruction
Component 15 – Tongue Base (TB) Retraction	Component 15 – Tongue Base Retraction (TB)
Judge during maximum retraction of the tongue base.	Judge during maximum retraction of the tongue base.
0 = No contrast between TB and posterior pharyngeal wall (PW)	0 = No contrast between TB and pharyngeal wall (PW)
1 = Trace column of contrast or air between TB and PW	1 = Trace contrast or air between TB and PW
2 = Narrow column of contrast or air between TB and PW	2 = Narrow column of contrast between TB and PW
3 = Wide column of contrast or air between TB and PW	3 = Wide column of contrast or air between TB and PW
4 = No visible posterior motion of TB	4 = No visible posterior motion of TB
Component 16 – Pharyngeal Residue	Component 16 – Pharyngeal Residue
Judge after the first swallow of after the last swallow of the sequential swallow task.	Judge after first swallow or after last swallow in case of sequential swallows.
0 = Complete pharyngeal clearance	0 = Complete pharyngeal clearance
1 = Trace residue within or on pharyngeal structures	1 = Trace residue within or on pharyngeal structures
2 = Trace residue within or on pharyngeal structures	2 = Collection of residue within or on pharyngeal structures
3 = Majority of contrast within or on pharyngeal structures	3 = Majority of contrast within or on pharyngeal structures
4 = Minimal to no pharyngeal clearance	4 = Minimal to no pharyngeal clearance
Location A= Tongue base B= Valleculae C= Pharyngeal wall D= Aryepiglottic fold E= Pyriform sinuses F= Diffuse (> 3 areas).	Location A = Tongue base B = Valleculae C = Pharyngeal wall D = Aryepiglottic folds E = Pyriform Sinus F = Diffuse (> 3 areas)
Esophageal Impairment	Esophageal Alteration
Component 17 – Esophageal Clearance Upright Position	Component 17 – Esophageal Clearance in Upright Position
Judge in AP view during bolus transit through the oral cavity to the LES.	Judge in anteroposterior view during the bolus transit through the oral cavity to lower esophageal segment (LES)
0 = Complete clearance; esophageal coating	0 = Complete clearance; esophageal coating
1 = Esophageal retention	1 = Esophageal retention
2 = Esophageal retention with retrograde flow below pharyngoesophageal segment (PES)	2 = Esophageal retention with retrograde flow below pharyngoesophageal segment (PES)
3 = Esophageal retention with retrograde flow through PES	3 = Esophageal retention with retrograde flow through PES
4 = Minimal to no esophageal clearance	4 = Minimal to no clearance

DISCUSSION

By analyzing national and international studies that used VFS as part of swallowing assessments, it is possible to detect great disparities in evaluation procedures⁽⁷⁾. As previously mentioned, professionals from either Brazil or the USA perform the examination with markedly distinct approaches regarding patient positioning, volume, consistencies and utensils. The same is true when analyzing investigation results: 71.42% of Brazilian reports do not employ the laryngotracheal penetration and aspiration scale, and there is no description of swallowing physiology evaluation parameters⁽⁷⁾. Even though this matter is not recent and some domestic authors have proposed elements that should be monitored during examination⁽⁷⁾, there are no

known instruments that allow categorization of physiological findings into impairment degrees based on well-established parameters in order to differentiate them.

This backdrop, associated with the importance of propagating a standardized protocol for performing and interpreting VFS results⁽⁷⁾, inspired the translation of component scores from MBSImP. Even though the effective application of the protocol in clinical practice requires professionals to be certified⁽¹⁴⁾, the project of translating and culturally adapting this excerpt of MBSImP encourages standardized VFS practices among Brazilian speech-language pathologists. Therefore, this study does not intend to replace therapists training backgrounds so they can employ the MBSImP protocol, but instead to illustrate possibilities for improvement of their practices.

Although original authors named the protocol Modified Barium Swallow Impairment Profile, the specialist committee chose, for the Brazilian Portuguese version, the name “Escala Martin-Harris para videofluoroscopia da deglutição” (“Martin-Harris Scale for swallowing videofluoroscopy”). This adaptation was suggested as a way to emphasize, standardize and facilitate its application in Brazil, specifying the principal author’s name to differentiate the protocol from other instruments with generic names in domestic publications⁽¹⁹⁾. This modification was approved by original protocol authors.

First versions translated into Brazilian Portuguese (TP1 and TP2) displayed some differences between them. While a few were subtle, without any further significance, others required editing. Differences that gave rise to deliberations among committee members when creating the synthesized version (BPSV) will be discussed, omitting details that were not related to possible semantic, idiomatic, conceptual and/or contextual issues.

While in TP1 terms “Oral Impairment”, “Pharyngeal Impairment” and “Esophageal Impairment” were translated into “Deficiência Oral”, “Deficiência Faringea” and “Deficiência Esofágica”, in TP2 the same terms were “Alteração Oral”, “Alteração Faringea” e “Alteração Esofágica”. Considering multiple meanings of the word “Deficiência” in Brazilian Portuguese, specialists agreed upon the term “Alteração” for BPSV.

For each component, authors of the original protocol provide brief directions for therapists concerning the moment of score attribution or what aspect must be considered when doing so (example for component 1: “Judge at any point during the swallow”). While in TP1 the word chosen for “Judge” was “Julgue”, in TP2 the word was “Avalie”. The committee considered the term “Julgue” to be closer to the implication of value attribution inherent to the original English word. Given that effective use of the protocol requires prior certification, it was decided that the term “Julgue” semantically assumes and stresses the existence of qualified arbitration.

Translation of score 1 (“Slow prolonged chewing/mashing with complete re-collection”) from component 3 (“Bolus Preparation/Mastication”) in TP1 was “1 = Mastigação/trituração lenta prolongada com re-coleção completa”. In TP2, it was “1 = Mastigação/trituração lenta, prolongada com organização completa do bolo”. The term “re-coleção” was regarded as a literal translation and semantically inappropriate, as in Brazilian Portuguese it means “austere life”. A deep knowledge of the protocol allowed speech-language pathologists from the committee to realize that this score, besides chewing, includes tongue functionality in collecting the mashed bolus in the oral cavity. Accordingly, the Brazilian Portuguese version was adapted to “1 = Mastigação/trituração lenta e prolongada, com reunião completa do bolo”.

Knowledge of the protocol also improved the Brazilian Portuguese version of components 12 (“Pharyngeal Stripping Wave”) and 17 (“Esophageal Clearance Upright Position”). In TP1, component 12 was translated as “Onda Faringea Uniforme”, while in TP2 the translator opted for “Onda de decapagem faringea”. As reported by the original authors, this component allows to evaluate the sequence of pharyngeal contractions extending from the nasopharynx to the pharyngo-esophageal segment that aid in bolus clearance. In Brazilian Portuguese,

the terms “onda de contração faringea”⁽²⁰⁾ and “onda de pressão faringea”⁽²¹⁾ have been used. Since the authors intent was to assess pharyngeal contraction functionality in lateral view, this component was converted to “Onda de limpeza faringea”. It is separate from component 13 (“Pharyngeal Contraction”), which represents the combination of pharyngeal contraction and bolus clearance functionalities in anteroposterior view. The term “decapagem” was regarded as a literal translation, culturally and semantically inadequate.

In the case of score 0 (“Complete clearance; esophageal coating”) from component 17, the term “revestimento esofágico” was selected in both TP1 and TP2 corresponding to “esophageal coating”. The specialist committee discussed the need for a cultural adaptation in this context, given the usual interpretation of “revestimento esofágico” among Brazilian speech-language pathologists. Even though, in isolation, the term refers to the esophagus inner wall, its mention in score 0 complements the qualitative observation of bolus transit. According to the original protocol, score 0 indicates complete clearance of esophageal contents, even if there is some remaining residue coating the esophagus wall, which allows its observation.

The instruction (“Judge after first swallow or after the last swallow of the sequential swallow tasks”) from component 5 (“Oral Residue”) also required adjustments for the Brazilian Portuguese version. In TP1, the translator opted for “Avalie após a primeira deglutição ou depois da última deglutição numa sequência de tentativas de deglutição”. TP2, however, was written as “Julgue após primeira tentativa de deglutição ou após última tentativa de deglutição na sequência de exercícios de deglutição”. Based on the training course for MBSImP, committee therapists agreed on “Julgue após a primeira deglutição ou após a última deglutição nas tarefas de deglutições sequenciais”, because the protocol recommends 12 predefined swallowing tasks (not attempts), with each swallow performed in a single sip and sequential sips (only for liquid boluses). The term “exercícios de deglutição” was disregarded because it promotes an interpretation related to rehabilitation instead of an evaluation procedure.

There were technical terms in TP2 (“região mentoniana”, in component 1 and “véstibulo nasal” and “rinorreia”, in component 7) which may be frequent in otorhinolaryngology, but are not, however, common in speech-language pathology clinical practices in dysphagia. In the translated version, the committee decided to use the terms “queixo”, “narina” and “saída alimentar”, respectively. Lastly, translation of component 6 (“Initiation of Pharyngeal Swallow”) from both translators was “iniciação da deglutição”. Although the term “iniciação” can be found in Brazilian speech-language pathology scientific literature, the term “início da deglutição faringea” was preferred, as it has also been used by other investigators⁽²²⁾.

Back translated versions (RT1 and RT2) suggested that, despite differences between translators, translation into Brazilian Portuguese complied with the original version content as intended by the protocol authors, with no conceptual issues that required further revisions. This compliance was verified when the final Brazilian Portuguese version was employed in clinical practice (step 6), since there were no disparities between the use of translated and original versions in any of the three subject groups.

CONCLUSION

Translation from an excerpt of the protocol Modified Barium Swallow Impairment Profile (MBSImp) into Brazilian Portuguese was compatible with the original version. Certification of committee members promoted appropriate adaptation of protocol contents, allowing conceptual and cultural adjustments to be made.

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Author contributions

ACCBP and DPL conceived and conducted the study, brought the translated protocol into use on videofluoroscopy examinations who assessed subjects with no disease, with head and neck cancer and with mild cognitive impairment. They also performed a critical reading of the translated and back translated manuscripts, organized the specialist committee and drafted the manuscript; CTC (translator 1) and ANC (translator 2) transcribed the English version of MBSImp into Brazilian Portuguese, while also being part of the specialist committee in adjusting and approving the back translated version and contributed to critical reading and supporting the final draft; LFM was a member of the specialist committee and performed a critical review of the manuscript; BMH and KD reviewed the final back translated draft and joined the specialist committee in approving the final draft.