

# **Os efeitos tóxicos do mercúrio das restaurações de amalgama sobre o meio ambiente e a saúde humana**

A Academia Internacional de Medicina Oral e Toxicologia, [www.iaomt.org](http://www.iaomt.org)

“Por razões médicas, as obturações de amalgama devem ser eliminadas dos tratamentos dentários o mais rapidamente possível. Como resultado, uma das nossas maiores fontes de mercúrio no meio ambiente pode ser eliminada.”( 1)

Dr. Maths Berlin (comissão de materiais odontológicos; Suécia 2003)

Sobre a IAOMT

A Academia Internacional de Medicina Oral e Toxicologia representa uma rede de profissionais da área médica e odontológica com membros na América do norte e outros capítulos de filiados em mais de catorze outros países. A IAOMT vem pesquisando os danos que as obturações de amalgama infligem ao meio ambiente e aos seres humanos desde que esta organização sem fins lucrativos foi criada, em 1984.

Um breve resumo sobre o mercúrio utilizado na odontologia-( 2)

Milhões de dentistas em todo mundo utilizam rotineiramente o amalgama como material de preenchimento para reparar os dentes cariados.

Referidas como amalgama de prata, elas tem em sua constituição 45 a 55 % de metil mercúrio.

De acordo com a Agência de Proteção Ambiental Americana (EPA), existem atualmente mais de 1000 toneladas de mercúrio nas bocas dos americanos, o que representa mais da metade de todo mercúrio utilizado nos Estados Unidos hoje (3). Ainda de acordo com o EPA, anualmente, a odontologia americana responde por 14% do uso doméstico do mercúrio. (4)

A utilização do mercúrio na odontologia foi cercada de controvérsias desde 1800, quando a neurotoxina foi amplamente introduzida como material de preenchimento. A Sociedade Americana de Cirurgiões, antecessora da American Dental Association, fez com que seus membros se comprometessem a não utilizar mercúrio por causa da sua conhecida toxicidade.

Mais recentemente, autoridades governamentais, cientistas, dentistas, consumidores e muitos outros, tem levantado serias preocupações sobre as ameaças que o amalgama de mercúrio representa aos seres humanos e ao meio ambiente de uma forma geral.

As autoridades hoje, incluindo o Programa Ambiental das Nações Unidas (UNEP), Food and Drug Administration (FDA) e a Comissão Europeia (CE) estão ativamente avaliando os riscos à saúde, associados a estas obturações de amalgama. (6, 7,8 )

Os governos da Noruega, Suécia e Dinamarca já baniram o uso do amalgama para obturações (9).

Alemanha e Canadá já tem sua utilização restringida em mulheres grávidas, (10 ,11) e Finlândia e Áustria tem recomendado que materiais odontológicos alternativos sejam utilizados em grávidas. (12)

Enquanto isso os danos que a utilização do mercúrio infligem a cada um de nos e ao meio ambiente continuam a ser demonstrados em diversos estudos científicos.

Os efeitos tóxicos do Amalgama; agosto de 2011 site [www.iaomt.org](http://www.iaomt.org)

Amalgamadas obturações polui o meio ambiente de varias maneiras:

Num relatório da Academia de Ciências de Nova York, de 2002, ficou constatado que de 40 a 60% do mercúrio nos portos de Nova York e Nova Jersey e proveniente das descargas de consultórios dentários. (13)

### 1 - Esgoto de consultórios odontológicos

De acordo com o EPA foram responsáveis por 50% de toda poluição de mercúrio que entrou na estação de tratamento publica em 2003. (14)

Estudos realizados também nos Estados Unidos, Canadá e outros países tem demonstrado que os consultórios dentários, contribuem por grande parte da contaminação de mercúrio no meio ambiente (15) . Nos Estados Unidos, a indústria odontológica e a terceira maior utilizadora, sendo responsável por mais de 45 toneladas de mercúrio por ano, (16) com uma faixa de descarga de 270 `a 484 mg por dentista por dia. (17, 18)

Como as estações de tratamento dos resíduos das águas sao concebidas para tratar resíduos humanos apenas, e não metais pesados, quando o mercúrio e descartado uma lama e separada, (bio-sólidos) (19), que são normalmente utilizados como fertilizantes ou incinerados, sendo o teor de mercúrio emitido novamente e transferido ao meio ambiente. (20)

### 2 - Dejetos Humanos

Pesquisas demonstraram que a media das pessoas que possuem obturações de amalgama, excreta aproximadamente 0,1 mg de mercúrio por dia através das fezes ( 22). Nos Estados Unidos isso equivale a mais de oito toneladas de mercúrio por ano, que acaba sendo liberada nos esgotos, córregos e lagos. (23)

“Na Suécia os cientistas estimam que 620 libras de mercúrio são liberadas na atmosfera a cada ano a partir de cremações.”(24) (Instituto de Medicina Ambiental, Suécia 1992)

### 3- Cremação

A cremação de corpos com restaurações de amalgama contribuem para as emissões do mercúrio na atmosfera, e deposições na terra e vias navegáveis. Um estudo suíço confirmou que a cremação lançou mais de 65 kg de mercúrio por ano em emissões muitas vezes superiores a do site Standards de mercúrio no ar (25). Em 1991 a cremação de 320.372 mil corpos adicionou cerca de 2800 libras de mercúrio na atmosfera americana. (26)

“A liberação de vapor de mercúrio a partir de bombas de vácuo em consultórios odontológicos, pode ser substancial, e exceder os níveis de exposição humana.”(27)

Stone, Cohen e Debban, Instituto Naval de Pesquisa Odontológica e Biomédicas 2007

### 3- O vapor do mercúrio

Em consultórios com tanques separadores de ar e água como parte do sistema de aspiração central, o

vapor de mercúrio foi encontrado no ar do lado de fora dos consultórios(28,29). O Dr. Paul G Rubin da IAO-MT explica que materiais contendo mercúrio são destinados ao lixo via sistema de bomba de vácuo, este sistema também joga fora grandes quantidades de ar, seja para atmosfera ou para o interior do próprio consultório, e também pelo esgoto, dependendo do equipamento. (30) Além disso o vapor de mercúrio é continuamente liberado a partir das restaurações de amalgama, (31) o que faz com que as pessoas estejam diretamente expostas ao mercúrio em suas bocas.

A liberação de mercúrio pode ser intensificada dependendo do número de obturações que o paciente possui, e também por outras atividades relacionadas a boca, tais como mastigação, ranger de dentes e consumo de bebidas quentes.(32,33)

O amalgama dentário prejudica o ser humano de várias formas

“ Não ha realmente nenhum lugar para o mercúrio em crianças”(34). Dr. Suresh Kotagal-Painel de Produtos Odontológicos do FDA ,2010

#### 4 - Gestantes e Crianças

A legislação internacional já alertou para o nítido e real perigo que o mercúrio representa para gestantes e crianças: como mencionado previamente neste documento, governos da Noruega, Suécia e Dinamarca já baniram a utilização deste material na odontologia, (35) enquanto Alemanha e Canadá limitaram o uso em gestantes (36,37), e França, Finlândia e Áustria recomendaram também que materiais alternativos fossem escolhidos para gestantes. (38)

Em 2009, 19 membros do congresso americano escreveram uma carta ao FDA, para expressar sua preocupação sobre o mercúrio das obturações como foco de potencial perigo as gestantes e crianças, (39) e foi então que a representante da Califórnia Diane Watson introduziu um ato de proibição (Ato H.R.2101), ela exclamou:

“São na verdade as crianças que estarão em maior risco através destas obturações”(40)

Estudos comprovam que o mercúrio tem um impacto devastador e abundante em gestantes e crianças, razão pela qual elas são aconselhadas a evitar certos tipos de frutos do mar que podem conter metil mercúrio.(41,42,43)

Os perigos de exposição ao feto e a criança, através de amalgamas maternos também já foram amplamente e cientificamente discutidos.(44,45,46,47,48,49,50,51,52,53,54,55)

Dois estudos comumente referidos como Teste de Amalgama “Filhos da Nova Inglaterra” (56) Teste Infantil da Casa Pia (57) são repetidamente referidos, defendendo o uso do amalgama em crianças, mas pesquisadores e comentaristas demonstraram que esses estudos falharam ao não levar em consideração importantes fatores, tais como efeitos de longo prazo, predisposição genética, detecção de efeitos mais brandos e erros de medição . (58,59,60,61,62,63,64)

A ciência mais atualizada, continua a expor a devastação que o mercúrio das obturações causa as gestantes e as crianças. Num estudo, publicado em abril de 2011 na edição de Monitoramento e Avaliação Ambiental, notas “Como mostramos, a quantidade de obturações de amalgama em mulheres no período de amamentação, influencia fortemente o nível de mercúrio de seu leite materno. Leve em consideração que o leite materno é a única forma de nutrição nos primeiros meses de vida.(65). Um outro estudo recente da Science of The Total Environment publicou;

“recomendamos mudanças nas práticas odontológicas envolvendo amalgama, principalmente em crianças, com o objetivo de evitar exposição desnecessária ao mercúrio. (66)

O mercúrio foi identificado como um fator para o autismo, (67,68,69,70,71,72,73,74,75,76), assim como a contribuição das obturações maternas também foram diretamente ligadas ao autismo . (77,78,79,80,81)

As obturações de amalgama de mercúrio, são a principal fonte de exposição ao mercúrio para a

população em geral. (Skare 1995, Health Canada 1997).(82)  
Citado em artigo publicado pelo Programa das Nações Unidas para o Meio Ambiente, a Organização Internacional do Trabalho , a organização Mundial da Saúde

#### 5 - A população em geral

Extenso número de estudos e pesquisas internacionais documentam exaustivamente os riscos do mercúrio das obturações a saúde humana. Evidências científicas vinda de inúmeros cientistas respeitados e provenientes de todas as partes do mundo investigaram como o mercúrio destas obturações esta diretamente ligado a disfunção do sistema imunológico, (83,84,85,86,87,88,89,90), esclerose múltipla, (91,92,93,94,95,96), doenças renais, (97,98,99,100,101), síndrome de fadiga crônica (102,103,104,105), alergias (106,107,108,109) questões reprodutivas, (110,111,112) problemas cardiovasculares, (113,114) absorção de metais pesados pelo cérebro, (115,116) Doença de Lou Gherig (117,118) Doença de Alzheimer, (119,120) resistência a antibióticos, (121,122) perda de audição, (123) e um conjunto enorme de outros problemas de saúde. (124,125,126,127,128,129,130,131,132,133,134,135, 136,137,138,139)  
“aqueles que estão regularmente exposto ao mercúrio devem fazer exames médicos periódicos, dando ênfase ao SNC sistema nervoso central, pele, pulmões, rins, trato gastrointestinal.”

Da ficha de dados de segurança do material; utilização e manuseio.

#### 6 - Dentistas e Profissionais da área de Odontologia

Dentistas e suas equipes estão profissionalmente constantemente expostos ao mercúrio liberado rotineiramente destas obturações, por isso pesquisadores têm levantado inúmeras preocupações sobre a segurança deste pessoal. (141,142,143,144,145,146,147,148,149,150,151,152,153,154,155)

“E urgente que consideremos os efeitos do amalgama em muitas doenças”..

Mesmo sendo o amalgama o maior fonte de exposição ao mercúrio dos seres humanos, ele não esta regulado pelo FDA .(156). Da carta de 19 membros do congresso ,2009

Considerações adicionais sobre o Amalgama Dentário e a Saúde Humana  
Referencia aos Níveis de exposição

Depois que o sistema de saúde Canadense foi processado por um grupo de ativistas e consumidores, sobre a segurança dos dispositivos médicos, eles contrataram o Dr. G.Mark Richardson para fazer as recomendações sobre o amalgama. O Dr. Richardson apresentou um quadro resumindo dezessete possibilidades separadas da exposição de mercúrio em adultos. Se para a Agencia Americana para Substancias Toxicas e Registros de Doenças (ATSDR), o nível de risco mínimo (LMR) aceitável para exposição não ocupacional no ar, e de 0,014ug Hg/m<sup>3</sup>, então apenas uma única obturação de amalgama já exporia a pessoa a níveis mais altos do que aqueles que o Dr. Richardson mencionou. (157)

Na nova pesquisa, publicada este ano, relatórios do Dr. Richardson demonstram que mais de 67 milhões de norte americanos com idades de dois ou mais anos de vida, excederam os níveis considerados seguros de ingestão por vapor de mercúrio pela EPA, devido a presença dessas obturações de amalgama; enquanto que para o EPA na California, 122 milhões de norte americanos excedem aos níveis considerados seguros a sua ingestão por vapor de mercúrio, também devido as suas obturações de amalgama. (158)

Metil mercúrio no corpo humano

A pesquisa também já começou a explorar o fato de que o mercúrio das amalgamas e seu vapor podem se transformar em metil mercúrio dentro do corpo humano, (metil mercúrio e a forma mais toxica do mercúrio) Bactérias no solo ou na água podem converter o mercúrio em metil mercúrio,

uma forma do elemento que as vezes é ingerida por peixes, crustáceos e moluscos, (159) e como mencionado acima, por este motivo que gestantes e crianças são aconselhadas a retirar da sua dieta, peixe crustáceos e moluscos.(160,161,162)

Vários estudos têm documentado a capacidade que o mercúrio das obturações presente no corpo humano tem de se transformar em metil mercúrio na boca (163,164,165) e também por cepas específicas e bactérias do intestino,(166,167,168) revelando assim que o problema ambiental marítimo é o que afeta a saúde humana mais intimamente.

#### Predisposição Genética

A questão da predisposição genética para o envenenamento por mercúrio também tem sido descrita em vários estudos(169,170,171,172,173,174,175). Um desses estudos diz que cerca de 25% da população dos EUA é polimórfica para um genótipo específico associado a sensibilidade a toxina do mercúrio,(176) o que equivale hoje a 78 milhões de americanos.

#### Alergias ao Mercúrio

Em 1972 o Grupo Norte Americano de Dermatite de Contacto determinou que de 5 a 8 % da população americana demonstrou alergia ao mercúrio em testes de sensibilidade cutânea,(177)

O que equivale a cerca de 21 milhões de americanos hoje. Uma vez que dentistas não testam seus pacientes para alergia ao mercúrio antes de colocar obturações, isso significa que milhares de americanos são alérgicos a estas obturações sem ter conhecimento.

Outra pesquisa científica oferece resultados ainda mais alarmantes. Num estudo com 180 paciente com obturações, foram feitos os testes cutâneos; 16.1% daqueles sem doenças alérgicas e 22.5% com doenças alérgicas testaram positivo para alergia ao mercúrio.(178) Em outro estudo de 29 pacientes com líquen plano 62% testou positivo para alergia ao mercúrio,(179) e na Universidade Baylor (Escola de Odontologia) de 171 estudantes testados, 32% testaram positivo a alergia. Os que testaram positivo tinham relação direta com a quantidade de obturações e o tempo em que cursavam a escola de odontologia. (180)

#### Fatores Coexistentes

Finalmente deve notar-se que o mercúrio influencia diferentemente cada pessoa, baseado numa gama de fatores coexistentes. Pesquisas cuidadosas demonstraram como a quantidade de obturações de amalgama na boca, (181,182,183,184,185,186,187,189) e diferentes vias de exposição das obturações, (190,191,192) gênero, (193,194) placa, (195) consumo de selênio, (196) e de leite (197,198,199) ou álcool (200,201,202) e outras circunstâncias, podem, (203,204,205,206) desempenhar um papel na reação, único de cada pessoa ao mercúrio.

“ O tratamento odontológico sem mercúrio está se tornando norma “(207)

-Carsten Lassen e Jakob Maag ( Conselho Nordico de Ministros INC1 junho de 2010)

Soluções sugeridas aos riscos do mercúrio pela obturação de amalgama.

Assim como alguns países conseguiram eliminar com sucesso as obturações que contêm mercúrio, banir o mercúrio da odontologia já se provou economicamente viável.(208)

Várias considerações devem fazer parte do total esforço para banir as obturações de amalgama.

#### A - Separadores de Amalgama

Os separadores podem diminuir consideravelmente a quantidade de mercúrio que sai de nossos

consultórios para os esgotos. (209,210), e são essenciais no bloqueio desse mercúrio para o meio ambiente. Mesmo assim é importante lembrar que a manutenção destes equipamentos deve ser cuidadosa, como a sugestão feita pela Academia de Cirurgiões Dentistas de Ontário, Canadá (211), e que estes separadores resolvem somente o problema dos esgotos e não os danos adicionais causados pelo mercúrio à vida humana e ao meio ambiente.

#### B - Alternativas de materiais de preenchimento em substituição ao amálgama de mercúrio

Muitos consumidores escolhem obturações de compósito por questões estéticas e segundo a Academia Americana de Odontologia, (ADA) essas obturações têm um custo moderado. (212) A ADA também oferece materiais de ionômero de vidro, e materiais indiretos de restauração como cerâmicas, ligas de ouro, e compósitos indiretos entre outras alternativas para o amálgama.

Embora um estudo tenha mostrado que menos da metade dos dentistas nos EUA estão utilizando o amálgama, (214) um outro estudo também recente publicado no Journal of the American Dental Association oferece estatísticas que demonstram que as obturações de mercúrio ainda são rotineiramente utilizadas em grupos étnicos minoritários, incluindo 53.4% de afro-americanos, 72.9% de índios americanos, nativos do Alasca, asiáticos, e pessoas das Ilhas do Pacífico (215).

Somado a isto, um trabalho igualmente publicado no Journal of the American Dental Association sobre novos recrutas para marinha dos EUA e fuzileiros navais observa que embora o uso de resinas compostas está aumentando entre os dentistas, o amálgama ainda está respondendo por mais de 75% de todas as restaurações posteriores feitas nos recrutas. (216).

#### C - Remoção segura das restaurações de amálgama existentes

A remoção sem segurança pode acarretar em mais problemas ainda aos pacientes por causa das grandes quantidades de vapor de mercúrio oriundas da remoção pelas canetas de alta rotação. A IAOMT financia estudos internacionais e pesquisa na área de segurança dos materiais dentários e desenvolveu um protocolo seguro para remoção destas obturações.

#### D - Educando Dentistas

Enquanto alguns dentistas deixaram de utilizar o amálgama alguns ainda necessitarão de treinamento para odontologia livre de mercúrio. Como a Noruega, Suécia e Dinamarca baniram o mercúrio de suas escolas de odontologia este fato lança luz sobre como fazer uma transição para longe do amálgama.

#### E - Perspectiva Econômica

Em um relatório intitulado "A Economia no Regulamento do Amálgama Dentário", os autores observam que a utilização do amálgama já está em declínio e que as restrições sobre a utilização do mercúrio são inevitáveis. (218) Os autores concluem:

"Temos que pensar que os gastos da saúde pública necessários para tratar as doenças e condições conhecidas ou não, oriundas da contínua colocação de obturações de amálgama, de longe poderia exceder o custo relativamente administrável ao consumidor, para as alternativas".

Isto para não mencionar o custo para a economia de tempo de trabalho perdido devido a doenças e incapacidades. (219) Um cronograma internacional para banir o mercúrio, iria salvar as pessoas e o meio ambiente, além de promover um esforço global de cooperação.

"O mercúrio está entre as toxinas ambientais mais perigosas, e já existem alternativas satisfatórias ao mercúrio em produtos disponíveis, por isso cabe introduzir sua proibição". (220)  
Erick Solheim, Ministro de Desenvolvimento e Meio Ambiente da Noruega 2007

<sup>1</sup> Dr. Maths Berlin. “Mercury in Dental Materials—an updated risk analysis in environmental medical terms.” *An Overview of Scientific Literature published in 1997 to 2002*. (The Dental Material Commission, Sweden).

<sup>2</sup> World Health Organization. *Mercury in Health Care*. (Geneva, Switzerland: policy paper, August 2005), 1. [http:// www.who.int/water\\_sanitation\\_health/medicalwaste/mercurypolpaper.pdf](http://www.who.int/water_sanitation_health/medicalwaste/mercurypolpaper.pdf)

<sup>3</sup> United States Environmental Protection Agency. *International Mercury Market Study and the Role and Impact of US Environmental Policy*. 2004.

<sup>4</sup> *Ibid.*

<sup>5</sup> Health Canada. *The Safety of Dental Amalgam*. 1996. [http://www.hc-sc.gc.ca/dhp-mps/alt\\_formats/hpfb-dgpsa/pdf/md-im/dent\\_amalgam-eng.pdf](http://www.hc-sc.gc.ca/dhp-mps/alt_formats/hpfb-dgpsa/pdf/md-im/dent_amalgam-eng.pdf)

<sup>6</sup> United Nations Environmental Programme. *Reducing the Risk from Mercury*. <http://www.unep.org/hazardoussubstances/Mercury/tabid/434/language/en-US/Default.aspx>

<sup>7</sup> United States Food and Drug Administration. *2010 Meeting of the Dental Products Panel*. December 14-15, 2010. <http://www.fda.gov/AdvisoryCommittees/CommitteesMeetingMaterials/MedicalDevices/>

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<sup>16</sup> *Ibid.*

<sup>17</sup> Arenholdt-Bindslev, D., Larsen, A.H. "Mercury Levels and Discharge in Waste Water from Dental Clinics." *Water, Air, Soil,*

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<sup>18</sup> Naleway, C et al. "Characteristics of Amalgam in Dental Wastewater" (abstract). *JDentRes.* 73:105, 1994.

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Website: [www.iaomt.org](http://www.iaomt.org) ; Contact: [info@iaomt.org](mailto:info@iaomt.org)

<sup>19</sup> Larose, Pierre. *Position Paper*. IAOMT Environmental Committee, 2011.

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<sup>21</sup> Skare, I., Enqvist, A. "Amalgam Restorations: an important source of human exposure of mercury and silver."

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<sup>22</sup> Bjorkman et al. "Mercury in Saliva and Feces after Removal of Amalgam Fillings." *Tox. Appl Pharm.* 144(1): 156-162.

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